AD-A068 446 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. LOWER LAKE NIMHAM DAM, INVENTORY N--ETC(U)
SEP 78 E A NOWATZKI, G S SALZMAN DACW51-78-C-0035

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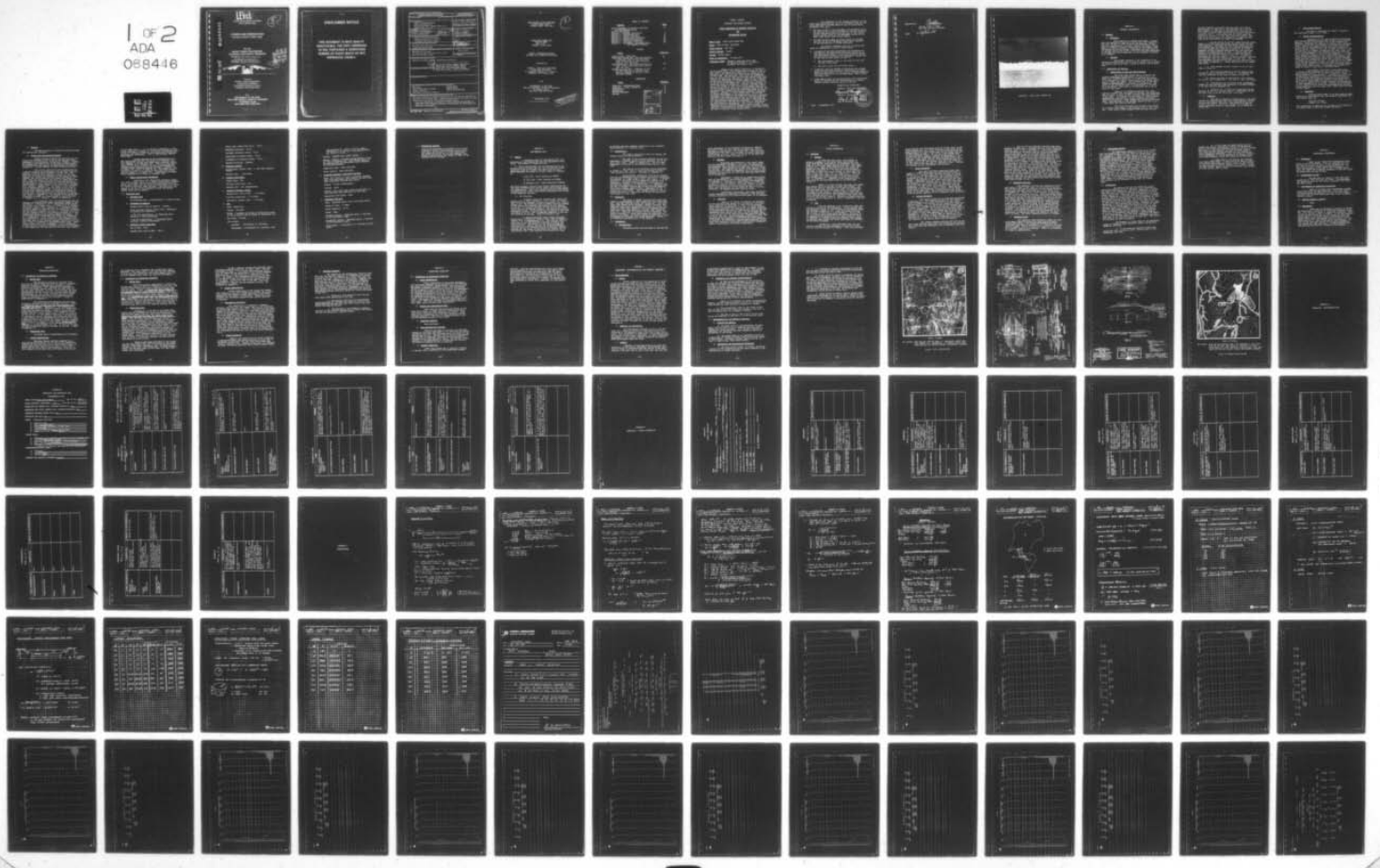

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LOWER HUDSON RIVER WATERSHED
BAILEY BROOK BASIN

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LOWER LAKE NIMHAM DAM
PUTNAM COUNTY, NEW YORK

NY 137
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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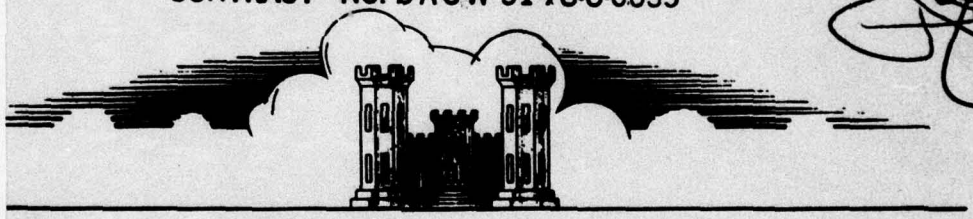

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For
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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
Phase I Inspection Report
Lower Lake Nimham Dam
Bailey Brook Basin, Putnam County, N.Y.
Inventory No. N.Y. 137

5. TYPE OF REPORT & PERIOD COVERED
Phase I Inspection Report
National Dam Safety Program

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
(10) Edward A. Nowatzki, Ph.D.
Gary S. Salzman, P.E.
(12) 182p.

8. CONTRACT OR GRANT NUMBER(s)
(15) DACW-51-78-C-0035 ✓

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Joseph S. Ward and Associates
91 Roseland Avenue, P.O. Box 91
Caldwell, New Jersey 07006

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
(11)

11. CONTROLLING OFFICE NAME AND ADDRESS
New York State Department of Environmental Conservation/ 50 Wolf Road
Albany, New York 12233

12. REPORT DATE
17 Sept[illegible] 1978

13. NUMBER OF PAGES

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)
Department of the Army
26 Federal Plaza/ New York District, CofE
New York, New York 10007

15. SECURITY CLASS. (of this report)
UNCLASSIFIED

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
Approved for public release; Distribution unlimited.

(6) National Dam Safety Program. Lower Lake Nimham Dam, Inventory Number (NY137), Lower Hudson River Watershed, Bailey Brook Basin. Phase I Inspection Report.

17. DISTRIBUTION STATEMENT (of the abstract

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Putnam County
Bailey Brook
Lower Lake Nimham Dam

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Lower Lake Nimham Dam was judged to be safe, although the spillway is considered to be inadequate additional investigation and maintenance actions were recommended.

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LOWER HUDSON RIVER WATERSHED
BAILEY BROOK BASIN
PUTNAM COUNTY, NEW YORK

LOWER LAKE NIMHAM DAM
TOWN OF KENT
NDS # 137
NYSDEC # 231A-3519A

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Prepared by

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For

DEPARTMENT OF THE ARMY
New York District, Corps of Engineers
26 Federal Plaza
New York, New York 10007

7 September 1978

TABLE OF CONTENTS

PLATES

APPENDICES

PHASE I REPORT

NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION

AND

RECOMMENDED ACTION

Name of Dam: Lower Lake Nimham Dam

Owner: Town of Kent (probable)

State Located: New York

County Located: Putnam

Stream: Bailey Brook

Date of Inspection: 30 June 1978

Inspection Team: Joseph S. Ward and Associates
91 Roseland Avenue, P. O. Box 91
Caldwell, New Jersey 07006

Based on our visual inspection, a review of the available data, and calculations performed as part of this study, the Lower Lake Nimham Dam is judged to be in generally good condition and functioning satisfactorily at this time. The spillways (drop inlet and emergency) will not collectively pass the Spillway Design Flood (SDF) without the dam being overtopped. Based on the screening guidelines established by the Department of Army, Office of the Chief of Engineers (OCE), the spillway capacity is therefore rated as inadequate. However, because there is not a high hazard to loss of life from large flows downstream of the dam at this time, the discharge capacity is not considered to be seriously inadequate based on the OCE guidelines for determining seriously inadequate spillway capacity. However, it could become seriously inadequate as future development of the area occurs. Since this assessment was based on OCE screening criteria, a detailed hydrologic and hydraulic evaluation of the watershed and spillway should be performed by the use of more precise and sophisticated methods and procedures. Following such an investigation, the need for, and type of, mitigating measures should be determined. Until such a study is completed and the spillway adequacy issue resolved, around-the-clock surveillance of the dam should be provided during periods of unusually heavy precipitation.

Our assessment of the general condition of the Lower Lake Nimham Dam has led us to recommend that the following measures be accomplished as soon as practicable, preferably this year:

1. The heavy brush on the embankment and emergency spillway must be cut as soon as possible, and the condition of the vegetation maintained that way in the future. Shallow rooted trees on the embankment should be cut down; deep rooted trees should remain.

2. The gate control wheel or wrench should be located, and the two 24-inch diameter sluice gates operated to the satisfaction of NYSDEC personnel.

We further recommend that the following measures be implemented as soon as practicable:

1. A program of periodic maintenance and inspection of the dam and its appurtenant structures should be established and followed. Particular attention during the next NYSDEC inspection and subsequent inspections by the Town of Kent should be paid to:

   a. The longitudinal crack in the crown of the left 48-inch outlet pipe.

   b. The sag in both 48-inch outlet pipes.

2. A specific plan for emergency operations and an emergency warning system should be formulated and implemented by distribution of the plan to affected agencies and individuals (e.g. Police Department, Town of Kent officials, etc.).

3. Large debris that has collected below the outlet apron should be removed now and periodically as a safety measure against personal injury by falling.

Respectfully submitted,

JOSEPH S. WARD AND ASSOCIATES

Edward A. Nowatzki, Ph.D., P.E.

Gary S. Salzman, P.E.

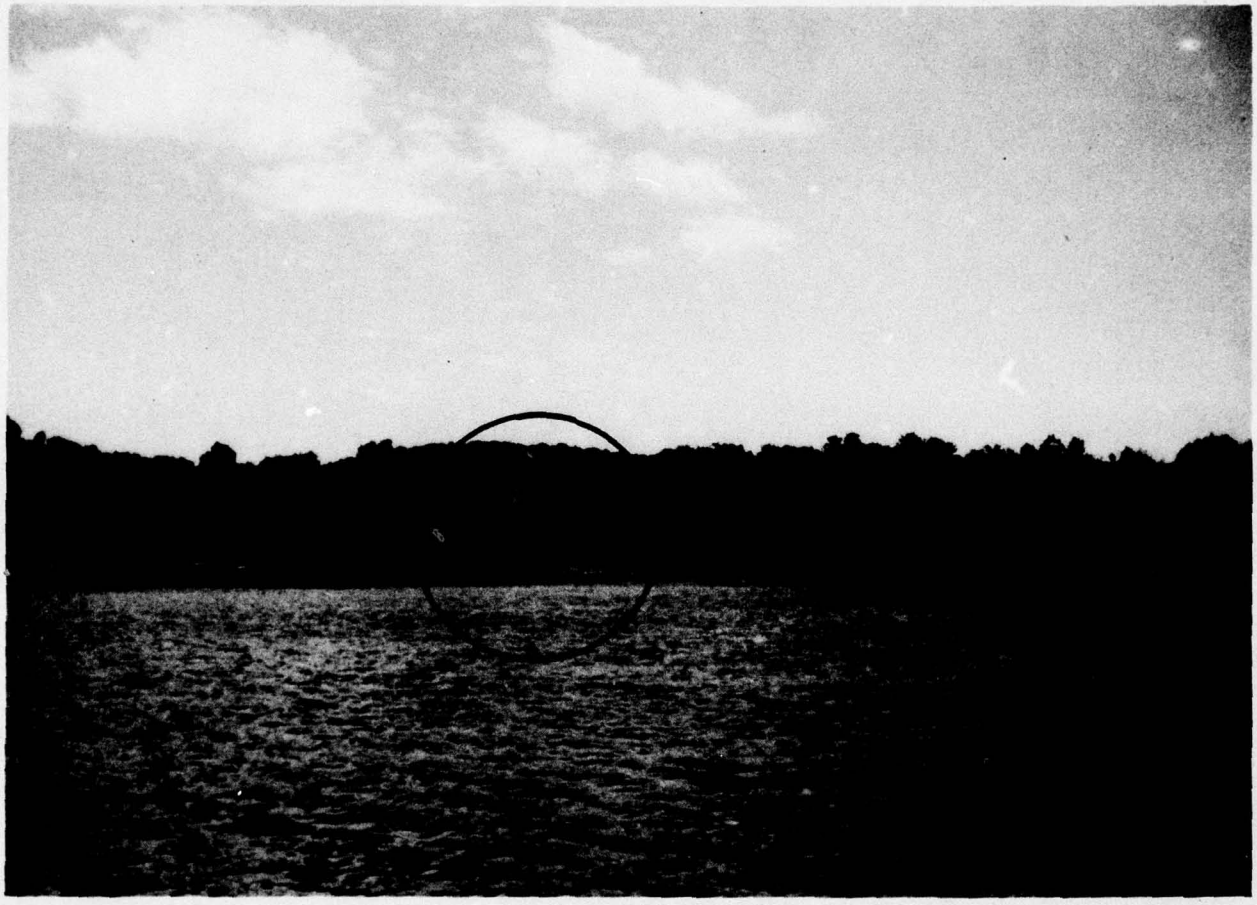
LICENSED PROFESSIONAL ENGINEER
GARY S. SALZMAN
No. 40046
STATE OF NEW YORK

Date: 7 September 1978

Approved by: Clark H. Benn

Colonel Clark H. Benn
New York District Engineer

Date: 27 September 1978



OVERVIEW - LOWER LAKE NIMHAM DAM

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority

The authority to conduct this Phase I inspection and evaluation comes from the National Dam Inspection Act (P.L. 92-367) of 1972 in which the Secretary of the Army was authorized to initiate, through the Corps of Engineers, a program of safety inspections of non-federal dams throughout the United States. Management and execution of the program within the State of New York has been undertaken by the New York State Department of Environmental Conservation (NYSDEC).

b. Purpose

The primary purpose of the inspection is to evaluate available data and to give an opinion as to whether the subject dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Description of Dam and Appurtenances

The Lower Lake Nimham Dam is an earth- and rockfill embankment approximately 145 feet long at its crest with a maximum height of 16.5 feet near the center. It is situated in a small ravine along the southwest shoreline of Lower Lake Nimham. The upstream face of the dam slopes at approximately 1 vertical to 3 horizontal. The slope of the downstream face is approximately 1 vertical to 2 horizontal. The crest is at elevation 729.0 and is about 20 feet wide.

There is a reinforced concrete drop inlet spillway located near the middle of the dam, the downstream edge of which is about 24 feet upstream from the centerline of the crest. It consists of two 6-foot by 3-foot chimney compartments, each having a 4-feet diameter reinforced concrete outlet pipe. Each chimney has a metal grate trash rack. The elevation of the chimney inlets is 725.0 (i.e. 4 feet below the crest of the dam).

The inlet structure also contains two 6-foot by 1.5-foot valve boxes on the upstream side of each chimney. Water enters these chambers from the lake via two

12-inch diameter reinforced concrete pipes that extend approximately 32 feet out to the upstream toe of the dam. Each chamber is connected to the drop inlet spillway by a 24-inch, circular, self-contained sluice gate (centerline elevation 714.0). The turning lugs for these gates are located on the crest of the inlet structure itself. The tops of the valve boxes are covered by a wooden platform from which the controls may easily be operated.

At the outlet of the two 4-feet diameter pipes, there is a 6-feet long reinforced concrete apron and bevelled headwall. The apron has some large stones set into the concrete that are meant to act as energy dissipators. A rip rap blanket that consists of large (4- to 8-feet diameter) boulders extends downstream from the apron and headwall for approximately 40 feet. A general plan and section of the dam and details of the inlet and outlet structures are found on Plates II and III. A number of modifications that were made to the dam following a failure on 9 February 1965 are incorporated in Plate III. (For correspondence related to this failure and a previous failure, refer to Appendix E.) These modifications are summarized below:

i. Four seepage collars instead of two as indicated in Plate II.

ii. Two 12-inch diameter valve box lead-in pipes instead of one as indicated in Plate II. No seepage collars are indicated on the lead-in pipes on Plate III.

iii. Built up crest of dam from El. 496.0 (Plate II) to El. 497.5 (Plate III). (El. 727.5 to El. 729.0 MSL.)

iv. Installation of an 18-inch thick impermeable blanket on the upstream slope extending a minimum distance of 50 feet from the upstream toe.

v. Addition of a 37-feet wide vegetated earthen spillway to act as a control section. Level grade of the spillway floor is at El. 495.5 (El. 727.0 MSL).

b. Location

The dam is located on Bailey Brook in the Town of Kent in Putnam County, New York, approximately 3 miles west of Lake Carmel, New York. The location of the dam is shown on Plate I, which is a portion of the USGS 7.5 minute Quadrangle Sheet of Lake Carmel, N.Y., N41°22'30", W73°37'30".

c. Size Classification

The dam is classified as "small" (storage = 200 acre-feet; height = 16.5 feet).

d. Hazard Classification

Inspection of the area immediately downstream from the dam and along Bailey Brook as far as Boyd Corners Reservoir indicated that there are no major population clusters, structures or highways in the path of a potential flood. Most of the homes located in the area are on high ground and are not expected to be seriously affected in case of flood. There is one home (circled on Plate I) that is marginal with respect to potential for major loss; however, it was apparently not affected during the 1965 failure of the dam (Refer to Plate IV and Appendix E). At that time, damage was caused "to Cole Shears Road and to a dam owned by Rose and Whittier just north of Cole Shears Road. Water had also crossed East Boyds Road; however, evidence of damage in this case was nil." At the time of our inspection, the dam referred to above was observed to be a privately owned, earth-fill structure with a concrete overflow spillway and control weir. It impounds the unnamed lake shown on Plate IV just above Cole Shears Road.

The present conditions in the flood plain of Bailey Brook downstream of Lower Lake Nimham as far as Boyd Corners Reservoir do not seem to warrant a "high" hazard potential classification. Although the entire area is developing residentially and future construction of homes in areas that might be affected by an overtopping of the Lower Lake Nimham Dam cannot be discounted, it is felt that a "significant" hazard potential classification is more appropriate at this time. Review and reevaluation of this classification should be performed after the next State inspection, but no longer than 5 years from the date of this report.

e. Ownership

Although there seems to be some question about ownership of the subject dam, our research indicates that the current owner is:

The Town of Kent
Carmel, N.Y. 10512

This conclusion is based on the information that there is no listed owner on the Town of Kent tax rolls.

f. Purpose

The dam was built to create an artificial lake for recreational purposes.

g. Design and Construction History

Rather extensive design and construction histories are contained in the files of the New York State Department of Environmental Conservation (NYSDEC). Selected excerpts from these files in the form of applications for construction and related correspondences are found in Appendix E. A brief summary of these histories follows.

The initial Application for Construction of a Dam was received and approved by the New York State Department of Public Works (NYSDPW) on 6 May 1954. The plans for this dam are contained on Plate II. The construction of the dam was completed in the summer of 1954; however, the sluice gate was not closed until March of 1955. When the water level was about 18 inches below the weir elevation, a break occurred at about the center of the dam three or four feet above the two 48-inch overflow pipes (Refer to letter dated 11 July 1955 from R. Burgess to B. Tallamy - Appendix E). The cause of this failure was not determined and it did not result in any loss of life or major property damage. Revised plans and an Application for Reconstruction were received by NYSDPW on 12 July 1955. This application was approved on 4 August 1955 (Refer to Appendix E). The nature of the actual modifications is noted in a letter dated 28 July 1955 from R. Burgess to D. P. Ogsburg. (Refer to Appendix E.)

On 9 February 1965, the reconstructed dam was breached and caused minor damage downstream (Refer to letter from M. N. Sinacori to E. C. Hudowalski dated 18 February 1965, and a letter from J. E. Peck to E. C. Hudowalski dated 19 March 1965 - Appendix E). Subsequent investigations seemed to indicate that the design was "adequate for the purpose intended" but that ... "a source of trouble and the probable cause of the previous failures is at the entrance elevation to the outlet chamber structure." (Refer to memo dated 23 February 1966 from W. P. Hoffman to E. C. Hudowalski.) This "trouble" is the fact that with the elevations of the dam crest and outlet chamber being what they were in the original designs, there would be less than 1 foot of freeboard to accommodate peak flows. Experience showed this to be inadequate. It is interesting to note that Mr. William P. Hoffman, Director of the Bureau of Soil Mechanics, for the State of New York, also stated

in this memo that "... it is virtually impossible to accurately appraise the safety of a dam after construction when little or nothing is known of the construction procedures, practices and workmanship. This is particularly true of earth dams."

Another Application for Reconstruction of a Dam (Application #8-8-67) was filed on 14 February 1967 and received by the New York State Water Resources Commission (NYSWRC) on 27 February 1967. Details of the reconstruction are found on Plate III and in correspondences between various concerned parties between 13 January and 14 August 1967 (Refer to Appendix E). The permit for construction of what is now known as the Lower Lake Nimham Dam was issued on 14 August 1967. Construction was apparently completed on or before 31 December 1968.

h. Normal Operational Procedures

According to Mr. Harry Ward, Building Inspector, Town of Kent, there is no formal operational procedure. As far as he knew, the two 24-inch sluice gates were normally kept closed and lake level was maintained at or below El. 725.0 by the drop inlet spillway. The gates were not opened on the day of the inspection since the turning wheels could not be located.

1.3 Pertinent Data

a. Drainage Area

The drainage area is approximately 1.8 square miles.

b. Discharge at Damsite

Maximum known flood at damsite: unknown.

Total spillway capacity (drop inlet + emergency) at maximum pool elevation:

= 1581 cfs (approximate - if vegetated earth spillway is well maintained)

= 508 cfs (approximate - if vegetated earth spillway is poorly maintained).

c. Elevation (feet above MSL)

Top of dam: 729.0.

Maximum pool (top of dam): 729.0.

Normal pool (drop inlet weir): 725.0.

Emergency spillway: 727.0.

Upstream sluiceway invert: 712.5.

Downstream sluiceway invert: 712.5.

Streambed at sluiceway outlet: 712.5.

Maximum tailwater: unknown.

d. Reservoir Length

Recreational (normal) pool: = 1900 feet (approximate)

Maximum pool: > 1900 feet.

e. Storage (acre-feet)

Normal pool: 160.

Spillway crest pool: 200.

Maximum pool: 240 (approximate).

f. Reservoir Surface (acres)

Maximum pool (top of dam): > 40 acres.

Spillway crest pool: = 40 acres.

Recreation (normal) pool: < 40 acres.

g. Dam

Type: Earth-fill.

Length: 145 feet.

Height: Variable; 16.5 feet at center from crest of dam to natural bed of stream at downstream toe.

Top width: 20 feet.

Side slopes:

Upstream: 3 horizontal to 1 vertical.

Downstream: 2 horizontal to 1 vertical (from

approximately El. 729.0 to 727.5), then 3 horizontal to 1 vertical (from approximately El. 727.5 to 712.5).

Cutoffs: Puddled clay cutoff trench.

Zoning: Unknown - Original design drawing (Plate II) shows "selected fill" zone through center of dam and upstream and downstream shells composed of different material.

Impervious core: None indicated.

Grout curtain: None indicated.

h. Diversion Tunnels - Principal Spillway

Type: Two 6-foot by 3-foot reinforced concrete drop inlet spillways, each having a 48-inch diameter reinforced concrete pipe outlet.

Length: 57 feet (approximate).

Closure: None.

Access: Drop inlet near center of dam about 24 feet upstream from centerline of dam crest.

Regulating facilities: None.

i. Emergency Spillway

Type: Vegetated earth (soil with grass cover).

Length of weir: 37 feet.

Crest elevation: 727.0.

Gates: None.

Upstream channel: Vegetated earth; 3 vertical to 100 horizontal slope.

Downstream channel: Vegetated earth; 3 vertical to 100 horizontal slope.

Side slopes: 3 horizontal to 1 vertical on both sides.

j. **Regulating Outlets**

Controlled discharge is provided by two 24-inch diameter circular, self-contained sluice gates that drain two 6-foot by 1.5-foot gate boxes. The boxes are fed by two 12-inch diameter reinforced concrete pipes that extend 32 feet to the upstream toe of the dam.

SECTION 2

ENGINEERING DATA

2.1 Design

A moderate amount of engineering data was available for the subject dam and its appurtenant structures. The sources of these data are:

a. Three applications for the construction or reconstruction of a dam filed with various New York State regulatory agencies between the years 1954 and 1967. These documents are dated as follows (Refer to Appendix E):

6 May 1954 - date received by NYSDPW

12 July 1955 - date received by NYSDPW

27 February 1967 - date received by NYSWRC

The first document contains some design computations for the inlet structure and a set of runoff and spillway capacity computations. The third document contains hydrological computations for runoff, and design computations for sizing of the emergency spillway.

b. Two drawings:

A drawing entitled "Proposed Dam, Lower Lake Nimham, Town of Kent, Putnam Co., N.Y." (Plate II) dated Feb. 1954 by Roy Burgess, Consulting Engineer, Main Street, Carmel, N.Y. This drawing shows a general plan and section of the earth-fill structure and details of the headwall and inlet. It contains contours of the area in the immediate vicinity of the dam; however, the elevations are not referenced to MSL. This drawing was revised on 9 July 1955 and again on 26 July 1955 in apparent response to the initial failure of the dam. (Refer to Section 1.2g).

A drawing entitled "Lake Ninham, Spillway Modification" (Plate III) dated 21 Feb. 1966 by Robert D. Essert, P.E. of Poughkeepsie, N.Y. This drawing shows a plan view of the modifications proposed following the second failure. The details of the modifications are also shown in a section through the proposed emergency spillway and on an upstream profile of the dam. Specifications for the repair of the breach are spelled out on the profile view. This drawing was revised four times

to reflect the many comments contained in the correspondence referred to in Section 1.2g.

2.2 Construction

The formal construction data are scarce, and consist mainly of the following:

The logs of four borings advanced through the embankment by NYSDPW, Bureau of Soil Mechanics, on 15, 16 and 17 Nov. 1965. (Refer to Appendix E.) This was done subsequent to failure of the reconstructed dam on 9 Feb. 1965.

The results of an elevation survey performed by NYSDPW on 3 Dec. 1965 in which the borings and drop inlet spillway are located. (Excerpts in Appendix E.)

Miscellaneous information that can be gleaned from the correspondence which relates to as-built conditions. For example, in a memo dated 23 Feb. 1966 from W. P. Hofmann, Director of the Bureau of Soil Mechanics, NYSDPW, to E. C. Hudowalski, Assistant Superintendent of Operations and Maintenance, NYSDPW, it is stated that "... inspection of the site and examination of the boring logs indicates that the dam is probably constructed of local borrow material with little attempt made to obtain 'selected fill' as called for on the plans." This comment refers to the reconstructed dam at a time after the second failure which took place on 9 Feb. 1965.

2.3 Operation

The files of NYSDEC indicate that Upper Lake Nimham is approximately 4 feet higher than Lower Lake Nimham. This was verified during the inspection. Flow from Upper Lake Nimham occurs through a square, vertical, concrete box drop inlet, approximately 4 feet by 4 feet, connected to Lower Lake Nimham by a 30-inch diameter outlet pipe which runs under Smalley's Corners' Road (Refer to Plate IV). There are no controls on this structure. The outlet structure for Lower Lake Nimham was described in Section 1.2a above. No formal records of operation or flow discharges are available for either structure. There is no recording instrumentation at the damsite.

2.4 Evaluation

a. Availability

Engineering data were provided by the New York

State Department of Environmental Conservation (NYSDEC). The Town of Kent did not provide any additional data of engineering significance. Mr. Harry Ward, Chief Building Inspector for the Town, was available to answer questions, and provided us with a recent (1973) map of the area prepared by the Town (Refer to Plate IV).

b. Adequacy

Hydrology and Hydraulics - The runoff computations submitted to NYSWRC in 1967 with the application for reconstruction and repair are based on the Modified Cooke Method. They define the 50-year peak rate of runoff as 1340 cfs. The computations appear to be adequate. The computations for sizing the emergency spillway also appear adequate, but the basis on which they were performed could not be determined.

Embankment - There are no computations available on the design of the earthen embankment. In general, the upstream (1 vertical to 3 horizontal) and downstream (1 vertical to 2 horizontal) slopes conform to those conventionally used for dams of this type; however, no information is available on zoning within the dam or on the grain size distribution of the materials used in its construction. No seepage analyses could be found.

Appurtenant Structures - The inlet structural design computations submitted to NYSDPW in 1954 with the original application for construction appear to be adequate.

c. Validity

There is no reason to question the validity of the available data except for the hydraulic and hydrologic computations submitted in 1955 with the original Application for Construction of a Dam. In these computations, for evaluating the capacity of the outlet structure, no consideration was given to determining which of the two components would control the flow. It was assumed that the two 48-inch outlet pipes controlled, and could handle a flow of 445 cfs. Our calculations (Appendix C) show that the drop inlet weir cannot accommodate the capacity of these pipes and therefore it is the controlling component. In addition, the hydrologic computations presented in 1954 were very simplistic and probably substantially underestimated a realistically recurring storm flood.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General

As indicated previously, Lake Nimham is actually composed of two lakes, Upper Lake Nimham and Lower Lake Nimham, separated by an embankment on which there is a town road named Smalley's Corners' Road (Refer to Plate IV). Upper Lake Nimham drains into Lower Lake Nimham via the vertical drop inlet and pipe structure described in Section 2.3. On the day of the inspection, there was a slight flow (wave splash) of water over the edge of that drop inlet (Fig. 1, Appendix D). There was also a slight flow (about ¼-inch) over the weir of the twin chamber drop inlet spillway on Lower Lake Nimham (Fig. 2, Appendix D). Apparently both lakes were at or very close to the elevations noted on the USGS quad (Plate I).

There is a trail through the woods that leads from Nimham Drive to the dam on Lower Lake Nimham. The damsite was heavily overgrown with trees and shrubs and, with the water level of the lakes high, it was difficult to locate the dam itself. Figures 3 and 4, taken from the control gate platform, show respectively the left and right upstream portions of the embankment near their junction with the natural terrain. Because of these conditions, it was virtually impossible to obtain a meaningful overview photograph.

b. Dam

The dam appeared to be in generally good condition on the day of our inspection. It was obvious that the vegetative growth on the upstream and downstream faces had not been trimmed for some time, and there were many small trees in addition to lush shrubbery. The rip rap (8- to 12-inch size) surrounding the outlet structure on the upstream face appeared to be in good condition (Fig. 5, Appendix D), although there was evidence that vandals had removed some stones and thrown them down the chimneys of the outlet spillway.

Inspection of the downstream face and the junction between the dam embankment and natural terrain did not disclose evidence of seepage. Many large boulders

were observed just downstream from the outlet apron in the stream channel and up a short distance on the steep banks. Some wetness and a very slight flow was observed below the boulders about 15 feet to the right of the stream channel on the downstream slope. It was not clear whether the wetness was due to seepage through the embankment or flow from the outlet pipes that had been diverted around the boulders. Some minor erosion of the downstream face about 20 feet left of the left outfall pipe was also noted in an area where there was lack of vegetative cover. However, the erosion was not considered to be serious.

c. Inlet Structure

The inlet structure connecting Upper Lake Nimham to Lower Lake Nimham was described previously in Section 2.3. The drop inlet portion is shown in Figure 1. On the day of the inspection, the discharge pipe was submerged so flow into the lower lake could not be observed. Measurements of lake levels were made with reference to Smalley's Corners' Road. The lower lake level was measured to be approximately 6½ feet below road elevation and the upper lake level was measured to be approximately 2½ feet below road elevation; the measured difference in elevation is about 4 feet. These measurements verify the difference in elevations of the lakes given on the USGS quad. The observable portions of the inlet structure appeared to be in generally good condition.

d. Outlet Structure

The outlet structure was described previously in Section 1.2a. The concrete surfaces of the overflow inlet chimneys were in good condition with only minor scaling evident. On the day of the inspection, there was about 1 inch of water at the bottom of the chimneys and a slight flow through the 48-inch diameter outlet pipes (Fig. 6, Appendix D). The turning nuts and screw rods of the sluice gate controls were rusted and the gates did not appear to have been operated for some time (Fig. 7, Appendix D). Since a turning wheel or wrench was not available at the Town of Kent offices, and since no representative of the Town of Kent accompanied us during the inspection, the sluice gates were not opened.

The wooden platform covering the tops of the gate boxes and the steel trash rack covering the overflow drop inlet spillway appeared to be in generally good condition.

The two 48-inch diameter concrete pipes were observed to empty onto a concrete apron at their downstream terminus (Figs. 8 and 9, Appendix D). There were numerous large boulders on the apron, some of which are embedded into the concrete. One such boulder extends about 12 inches above the invert of the left outlet pipe and will probably impede free flow of water through the pipe (Fig. 8, Appendix D). A high water stain was observed at about midheight in the pipe. On the day of the inspection, there was about 9 inches of stagnant water above the invert of the pipe at the apron. The stagnant water extended upstream about half the way through the pipe. The 24-inch diameter gate openings could be observed in the overflow inlet chimney walls at the upstream end of the 48-inch diameter outfall pipes. There was a longitudinal crack about ¼ inch wide in the crown of the left outfall pipe. Both 48-inch pipes appeared to be sagging at a point about 3/4 of the way from the inlet chimney. The junctions between the pipes and the reinforced concrete headwall were moderately spalled and some reinforcing steel was visible (See crown of pipe in Fig. 9).

e. Emergency Spillway

The emergency spillway was located on a footpath about 55 feet to the right of the outlet structure. The spillway was heavily overgrown by tall brush and small, young trees upstream, downstream and on its crest (Fig. 11, Appendix D). There was a large boulder at about midchannel on the downstream portion. Steel tape measurements in the field indicated the spillway was about 50 feet wide from top to top and 38 feet wide across the bottom channel. Side slopes appeared to be approximately 1 vertical to 3 or 4 horizontal. The bottom channel was measured to be 2 feet lower than the surrounding grade. These measurements correspond closely to those in the design drawing of Plate III. Figure 11 shows the spillway looking longitudinally along the crest of the dam toward the right abutment. The inspector in the foreground is standing close to the crest of the dam while the inspector in the background is standing at about the middle of the emergency spillway. The heavy vegetative growth is evident.

f. Reservoir Area

The reservoir area contains a number of year-round homes along its shores and some docks for small recreational boats. The slopes are generally shallow (shallower than about 4 horizontal to 1 vertical) and are heavily wooded. Figure 10 shows the reservoir with Smalley's Corners' Road in the distance. There is no evidence of slides or sedimentation.

g. Downstream Channel

The downstream channel is about 30 to 40 feet wide and contains many large boulders at the outlet and for a distance of about 50 feet from the outlet apron (Fig. 12, Appendix D). These boulders appear too large to have been water transported, and were probably either glacier transported or man-placed. The slopes of the downstream channel are heavily wooded and relatively steep (approximately 2 horizontal to 1 vertical). There is a small amount of debris just downstream from the outlet apron, mostly consisting of felled trees. About ½ mile downstream, there is a private lake created by an earthfill dam with a controlled concrete spillway. (Refer to Plate IV and Section 1.2d.) Housing in the area is sparse with only about five or six homes near the stream between Lake Nimham and its lower drainage, Boyds Corners Reservoir. Inspection of the downstream area revealed that all of these homes are located on relatively high ground and will probably not be affected in the event of a major flood.

3.2 Evaluation

The subject dam and the inflow and outlet structures appeared to be in generally good condition at the time of our inspection, and it is reasonable to assume that they will continue to function satisfactorily under normal conditions. There was nothing observed at the time of the inspection to indicate that the structure is unsafe. However, there is strong evidence that maintenance of these structures is being neglected. The heavy brush on the dam and spillway does not look like it has been cut for at least two years, and probably more. Certainly the lush vegetation in the spillway has seriously reduced its capacity so that it cannot handle the flows for which it was designed (Refer to Appendix C). The fact that the gates have not been opened for some time and that the control wheel or wrench could not be located is also indicative of a lack of "procedural maintenance". These elements, if left uncorrected, could seriously compromise the design functions of the dam, cause it to be overtopped, and perhaps lead to its eventual failure by wash out. They should be corrected as soon as possible.

The presence of large trees on the embankment slopes of earthfill dams ordinarily poses a potentially dangerous condition.

a) If the trees are shallow rooted, they could blow over in a major storm, carrying part of the embankment with them.

b) If the trees are deep rooted, the root systems may extend transversely through the embankment. Death of the trees and subsequent decay of the root systems may result in the formation of water passages (pipes). Such pipes provide natural channels for the seepage of water through the embankment; this may result in erosion of the embankment or in the generation of seepage forces that would adversely affect the stability of the slope.

c) Some trees on the subject dam appeared to be well established. A study should be made to establish whether the trees are shallow rooted or deep rooted. If they are shallow rooted, removal is in order. If they are deep rooted, removal would be potentially more dangerous than leaving them in place.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures

There are no established operational procedures on file with NYSDEC. From our conversations with Mr. Ward of the Town of Kent, it was apparent that the Town did not have a formal operational procedure. In fact, the ownership of the dam is still clouded and we could not obtain the equipment necessary to open and close the gates from the Town of Kent.

4.2 Maintenance of Dam

The dam does not appear to have been maintained for at least the past two years. The embankment and emergency spillway are heavily overgrown with brush and small trees.

4.3 Maintenance of Operating Facilities

There is evidence that maintenance of operating facilities has been neglected. The riser rods of the sluice gates are beginning to rust and the wooden platform atop the gate boxes could use a coat of preservative or paint.

4.4 Warning System in Effect

None.

4.5 Evaluation

There are no procedures currently in effect for maintaining, operating or otherwise attending to the dam. This may be a result of undefined ownership. There is also no warning system in effect. It is felt that continued neglect of the dam and its operating facilities could result in its being unable to pass the Spillway Design Flood (SDF) and perhaps lead to failure by a complete wash out or local breaching of the structure. In view of the poor past history of the earth embankment with regard to local wash outs, it seems probable that the dam would be lost if it were to be overtopped.

SECTION 5

HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Hydraulic Features

a. Design Data

The structural details of the drop inlet spillway and outlet pipes are found on Plate II; however, there are no data or computations available on their hydraulic performance. Flow computations performed as part of this study indicate that with the lake level at the dam crest elevation, the drop inlet spillway can pass approximately 308 cfs and the twin 48-inch pipes can pass approximately 478 cfs. When the gates are fully opened and flow can pass through the 12-inch diameter control pipes, an additional 30 cfs can be passed. (Refer to computations in Appendix C.)

The vegetated earth emergency spillway was originally designed to safely discharge 1340 cfs. (Refer to Application for a Permit for the Reconstruction of a Dam, Appl. No. 8-8-67 - Appendix E.) Our computations indicate that this is a reasonable value for "canals with rough beds and weeds on sides". However, this value can change drastically with changes in the roughness of the channel and for a "very weedy natural stream" can drop as low as 212 cfs. If the present condition of the spillway is considered (heavily overgrown with trees and brush and a large boulder on the downstream slope) and the U.S. Soil Conservation Service's method for evaluating mean roughness coefficient for a channel is used (BUREC, Design of Small Dams, p. 577), the capacity of the emergency spillway is computed to be approximately 200 cfs. If this is the case, the dam can pass only about 27 percent of the PMF. (Refer to Appendix C.)

b. Experience Data

No formal data or measurements are available.

c. Visual Observations

The drop channel spillway appeared to be functioning satisfactorily on the day of the inspection, although we could not tell how it would perform under the design heads since there was less than ¼ inch of flow going over the weir during the inspection. The twin 24-inch diameter sluice gates were not opened on the day of

the inspection so no statement can be made about their operation. The water level in the gate box was observed to be at the lake elevation; this would suggest that the 12-inch diameter drain pipes are functioning properly.

5.2 Evaluation of Hydrologic Features

a. Design Data

The files contain computations in which the 50 year peak rate of runoff was computed as 1340 cfs. The Modified Cooke Method was used in determining this peak rate of runoff. (Refer to Application for a Permit for the Reconstruction of a Dam, Appl. No. 8-8-67, Appendix E.) No hydrologic data or gaging station records in the local basin could be found to verify these computations. According to the Recommended Guidelines for Safety Inspection of Dams, Department of the Army, OCE, the recommended Spillway Design Flood (SDF) for the subject dam is the 100-year to one half the Probable Maximum Flood (PMF) since the dam is classified as "small" and poses a "significant" hazard. For this study the SDF will be taken as one half the PMF.

b. Experience Data

Information on the PMF for the Lower Lake Nimham Dam and watershed was initially extrapolated from data for the nearby Fishkill Creek Basin contained in Hydrologic Flood Routing Model for Lower Hudson River Basin. This document was prepared for the New York District of the U.S. Army Corps of Engineers (USACE) by Water Resources Engineers, Inc., Springfield, Virginia. In this study, the rainfall-runoff mathematical model HEC-1 was used to reconstitute the major historical floods and to simulate the Standard Project Flood (SPF). In addition to the SPF simulation, the rainfall pattern for Tropical Storm Agnes was transposed and centered over Poughkeepsie, N.Y. and the discharges resulting from this rainfall were determined by an application of the calibrated model. In a telephone conversation with Mr. Thomas Smyth, USACE New York District, we were informed that for Phase I hydrologic analyses, the PMF could be considered as twice the SPF.

Since no data were available in this study for the Lake Nimham area, data pertaining to the nearby Fishkill Creek Basin (Subarea 1) were extrapolated and applied to the Lower Lake Nimham Dam. In these computations, the drainage areas of both Upper and Lower Lake Nimham were considered.

An HEC-1 computer program was performed using Hydrometeorological Report No. 33 (April 1956), with the site being in Zone 1. A 10 square mile area was considered for computing the percentage of the probable maximum precipitation. A loss rate of 0.1 inches per hour was used. The Snyder's Unit Hydrograph Coefficient was used. All of the above was in accordance with the suggestions of the USACE. Storms were then routed through the lake, in increments, from 10% to 100% of the PMF. The input computations (7 sheets) and the computer printout, are contained in Appendix C.

c. Visual Observations

Visual observation of the slopes and vegetative covering of the Lake Nimham area indicate that conditions there are similar to those described in the USACE document for the Fishkill Creek Basin. There was no one available for interview regarding peak runoffs observed in the past.

d. Overtopping Potential

The computations in Appendix C (computer printout) indicate that the subject dam will be overtopped by the Spillway Design Flood (SDF). The potential for overtopping is very much a function of the amount of vegetative growth on the emergency spillway. With the emergency spillway in its present condition, the dam can only pass about 54% of the SDF; once the thick vegetative cover is cleared from the emergency spillway, computations indicate that 96% of the SDF can be passed without overtopping the dam. However, these computations considered that the two gates for the 12-inch diameter control pipes were fully opened during the flood routing, and that the drop inlet spillway was under four feet of head during the entire flood routing; since this would not be the case during an actual storm, the actual percentages of the SDF that can be passed without overtopping the dam are less than the values presented above.

e. Hazard Potential

Based on the results of our visual inspection of downstream areas, the hazard potential at this time is considered "significant" for the Lower Lake Nimham Dam. (Refer to Section 1.2d.) However, since this is a developing area, the hazard potential could shortly become "high".

f. Spillway Adequacy

The results of the hydrological analysis indicate that the spillway capacity is inadequate with respect to passing the SDF; the topping of an earth dam often results in the rapid washout of a dam section. However, the spillways are not considered to be seriously inadequate today because there is not now a high hazard to loss of life from large flows downstream. If new construction generates a reclassification to "high" hazard, the spillways would be considered seriously inadequate as it would then satisfy all of the following conditions set forth in DAEN-CWE-HY Engineer Technical Letter No. 1110-2-234 dated 10 May 1978:

1. There is a high hazard to loss of life from large flows downstream of the dam.

2. Dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

3. The spillway is not capable of passing one-half of the Probable Maximum Flood without overtopping the dam and potentially causing failure.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observation

Visual observation of the earth embankment and reinforced concrete outlet structure did not disclose any signs of structural instabilities. The vertical and horizontal alignments appeared to have been maintained, and no evidence of cracks could be found in the embankment. As indicated previously, one of the 48-inch outlet pipes was cracked longitudinally along its crown; that crack is not considered serious at this time, although it should be inspected periodically to note if it is widening. At the time of the inspection, the crack was about ¼ inch wide. Some sagging of the two 48-inch outlet pipes was also noted. This too, although not considered serious at this time, should be kept under observation.

b. Design and Construction Data

Other than for the structural design of the drop inlet walls, no other design or construction data relating to stability were available for review. Since very little information was available regarding the embankment materials, stability or seepage analyses could not be performed as part of this study.

c. Operating Records

None available.

d. Post Construction Changes

There do not seem to have been any man-made changes to the earth embankment or to the inlet and outlet structures since the last reconstruction and repair of the subject dam in 1967. However, due to lack of maintenance, the dam and its emergency spillway have become heavily overgrown with brush and small trees. This growth is detrimental to the performance of the dam and the spillway and should be removed as soon as possible.

e. Seismic Stability

Lower Lake Nimham Dam is nominally located in Seismic Zone 1 according to the Algermissen Seismic

Risk Map. Although earthquakes that cause minor damage can be expected to occur in this Zone, the design and construction practices conventionally used for small earth dams are considered to be adequate in areas of low seismicity, and the safety factors used for static conditions should preclude major damage for all but the most catastrophic earthquakes. However, no computations were performed to verify this assessment for the subject dam.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

Visual inspection of the system and a review of the available engineering data indicate that the dam embankment and drop inlet spillway structure are in generally good condition, and functioning satisfactorily at this time. The emergency spillway, however, is heavily overgrown with brush and small trees and is not expected to perform to design criteria in the event of flood. Our approximate hydrologic/hydraulic calculations indicate that the discharge capacities of the drop inlet spillway and the emergency earthen spillway cannot now pass the SDF. Therefore, based on the OCE screening criteria, the discharge capacity of the Lower Lake Nimham Dam is inadequate and there is a danger of overtopping. Since there is not now a high hazard to loss of life from large flows downstream of the dam, the discharge capacity should not be classified as "seriously inadequate" even though the spillways could not pass the Spillway Design Flood (SDF) at this time. However, there is a possibility that the hazard classification may become "high" in the future. Therefore, it is strongly recommended that the heavy growth of brush and small trees on the emergency spillway be cleared as soon as possible and that the spillway be maintained in that condition in the future. Even if this is done, the discharge capacity of the dam will still be less than the SDF, so there will still be some danger of overtopping.

b. Adequacy of Information

The information available to us is not adequate for a detailed analysis of the stability of the structure or its operation under other than normal conditions. The information is sufficient, in conjunction with the results of the visual inspection, to make a reasonable assessment of the system's present condition and anticipated performance under SDF flows.

c. Urgency

Inasmuch as continued failure to clear the vegetation on the earthen embankment and emergency spillway will lead to conditions that may result in the overtopping of the dam, and in view of the fact that the area

is developing residentially, there is some urgency in performing the remedial work recommended below. The clearing of the brush can readily be accomplished this calendar year, and a specific set of operational and maintenance procedures can be developed within one year's time.

d. Necessity for Further Investigations

In view of the inadequacy of the spillways to pass the computed SDF without overtopping the dam, and in view of the fact that overtopping in the case of earthfill dams is often disastrous, the actual capacity of the spillway should be determined using more precise and sophisticated methods and procedures. This further investigation should be performed as soon as possible. Following this study, the need for and type of mitigating measures should be determined. Until such a study is completed, around-the-clock surveillance of the structure should be provided during periods of heavy precipitation.

There is no necessity for other investigations; however, special attention should be paid to the following items during the next scheduled inspection by NYSDEC.

1) The longitudinal crack in the crown of the left 48-inch outlet pipe should be checked to see that it has not opened wider or increased in length.

2) The sag in each of the 48-inch outlet pipes should be inspected to see that it is not getting worse.

7.2 Recommendations and Remedial Measures

a. Alterations/Repairs

1) The heavy brush on the embankment and emergency spillway must be cut or removed, and bare areas seeded with grass as needed. This trimmed condition of embankment and emergency spillway vegetation should be maintained in the future.

2) The large trees on the embankment should be investigated to determine whether they are shallow rooted or deep rooted. If shallow rooted, they should be cut down; if deep rooted, they should remain.

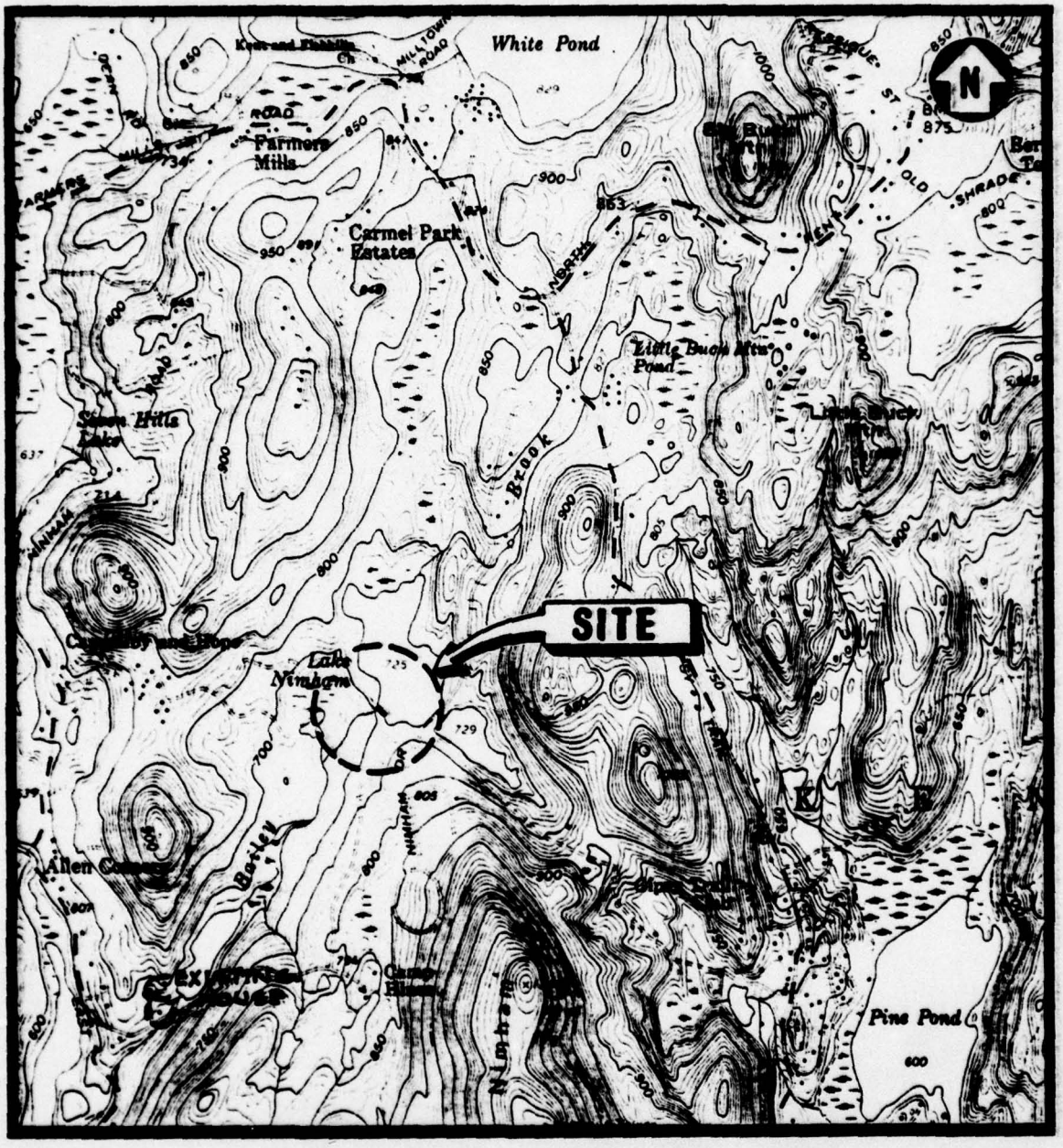
b. Operations and Maintenance Procedures

1) The gate control wheel (or wrench) should be located as soon as possible and the gates operated to the satisfaction of NYSDEC personnel.

2) A program of periodic maintenance of the dam and its inlet and outlet structures should be established and followed within one year's time.

3) Steps should be taken to formulate and implement a specific emergency operation and warning system for the dam. The plan should be written up and kept on file in the Town of Kent Municipal Building which houses both the police department and town engineering offices. Part of the procedure should include delegation of responsibility to qualified individuals for monitoring flows during periods of heavy precipitation, and checking on the apparent physical condition of the dam, its abutments and foundations during periods of heavy flow.

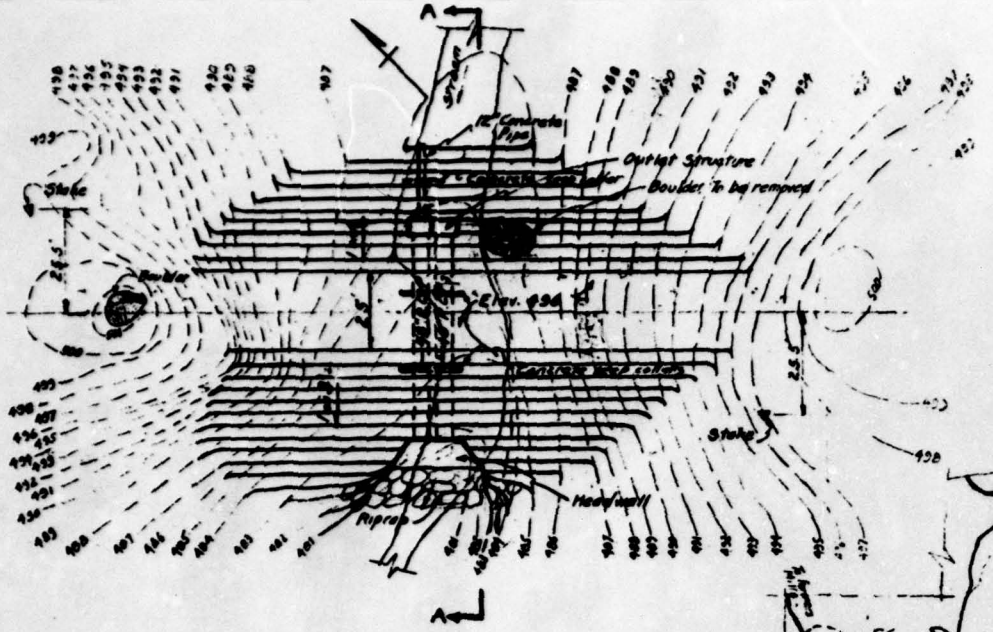
4) Large pieces of debris, such as felled trees, immediately downstream of the outlet apron, should be removed now and periodically in the future in order to lessen the possibility of someone's sustaining injury by falling from them.



SCALE: 1"=2000'

MAP SOURCE: BASE MAP WAS ADAPTED FROM U.S. GEOLOGICAL SURVEY MAP, LAKE CARMEL. N.Y. QUADRANGLE, 7.5 MINUTE SERIES 1960. (BASE MAP MAY NOT REFLECT RECENT CARTOGRAPHIC CHANGES)

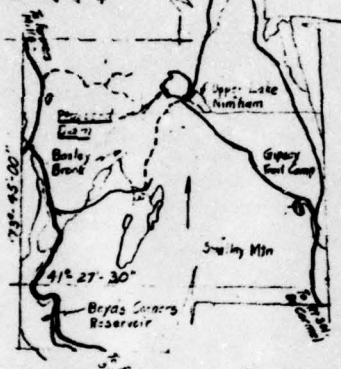
PLATE I SITE LOCATION MAP



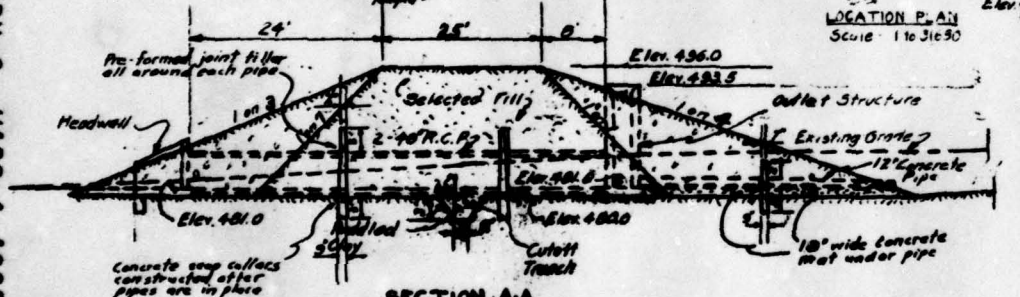
GENERAL PLAN
Scale 1" = 20'

LEGEND:
Existing Contours
Proposed Contours
Existing Grade
Proposed Grade
Riprap

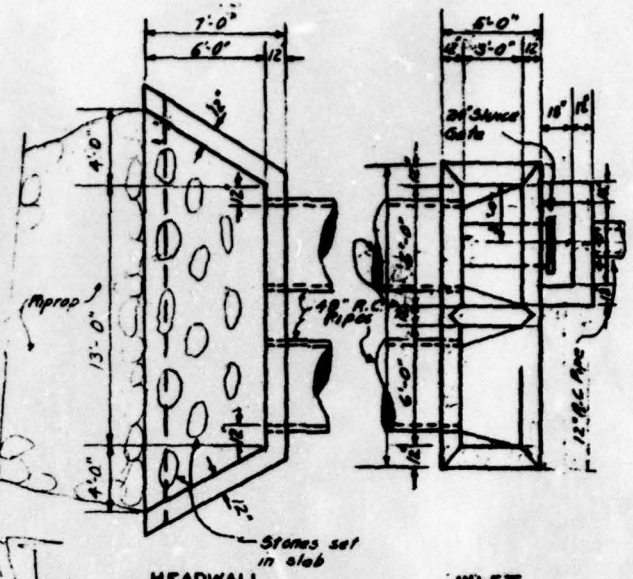
Notes:
1. Entire dam site to excavate to elevations shown or carried to impervious material.
2. Selected fill to consist of gravel & clay in proportions as directed, placed in 6" layers, wetted, and compacted by rolling.
3. Sluice gate to be a 24" circular, self contained sluice gate suitable for 10' seating pressure.
4. All fill around pipes, collars, inlet and headwall structures to be placed in 4" layers and adequately to secure maximum compaction.



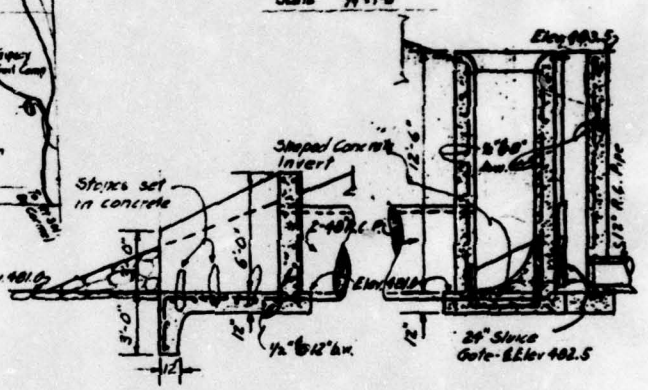
LOCATION PLAN
Scale 1 to 31250



SECTION A-A
Scale 1"=10'



HEADWALL PLAN INLET
Scale 1/4"=1'-0"



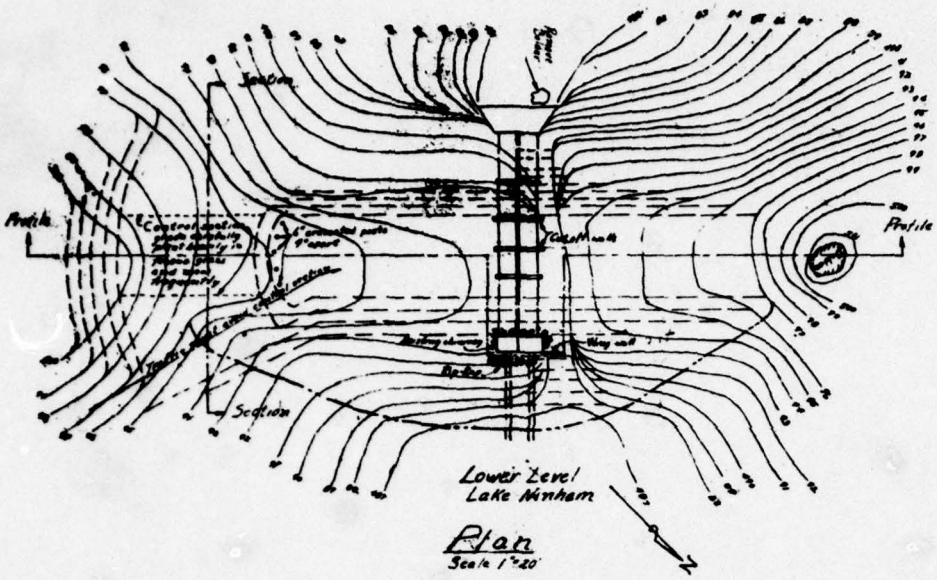
HEADWALL INLET
SECTION B-B
Scale 1/4"=1'-0"

PROPOSED DAM
LOWER LAKE NIMHAM
TOWN OF KENT, PUTNAM CO. N.Y.
Scale: As Noted FEB. 1954

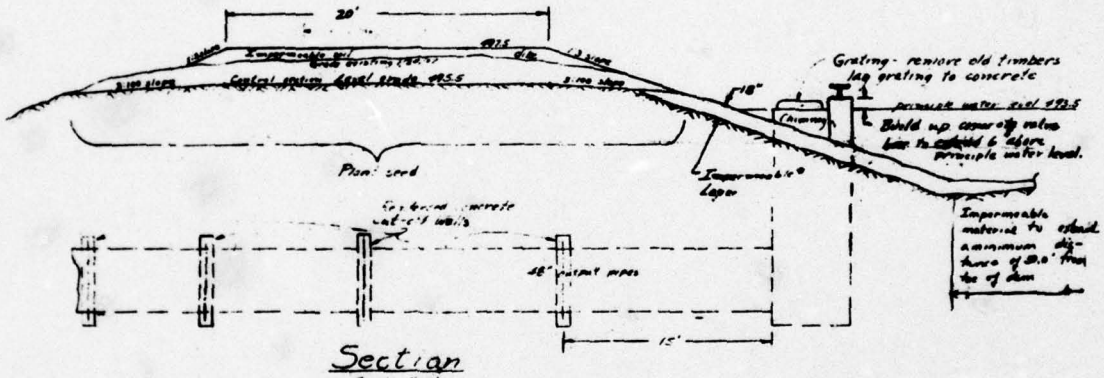
Revised July 26- 1955
Revised July 9- 1955

JOSEPH S. WARD & ASSOC.
CONSULTING ENGINEERS
PLATE II
JULY 1978

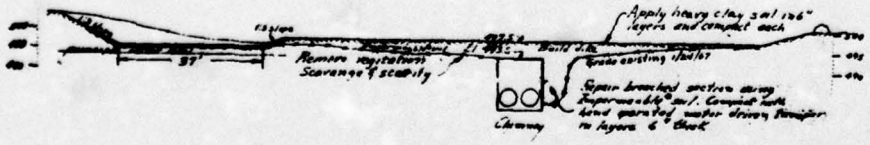
Roy Burgess, Consulting Engineer
Main Street, Carmel, N.Y.



Plan
Scale 1"=20'



Section
Scale 1"=5'



Profile
Scale 1"=20'

†Impermeable soil
Whenever impermeable soil is called for the following specifications shall apply.
Material:
Maximum particle size-3"
A percentage of 20% shall pass a #200 sieve
Free of organic material
Placement:
6" layers
Compaction:
Compact to 95% of max. dry density as per AASHO-T99-C.
Moisture content during placement within 2% of optimum.

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
SUBDIVISION OF WATERWAY OPERATION AND MAINTENANCE
Albany, N. Y. 12226

DESIGNATION NO. 7212-85-PDA (Dam No. 2019)

WATERSHED Housatonic River

Pursuant to the provisions of Section 46-a of the Conservation Law, the design, detail and specifications for the re-construction of the structure shown on these plans are hereby approved.

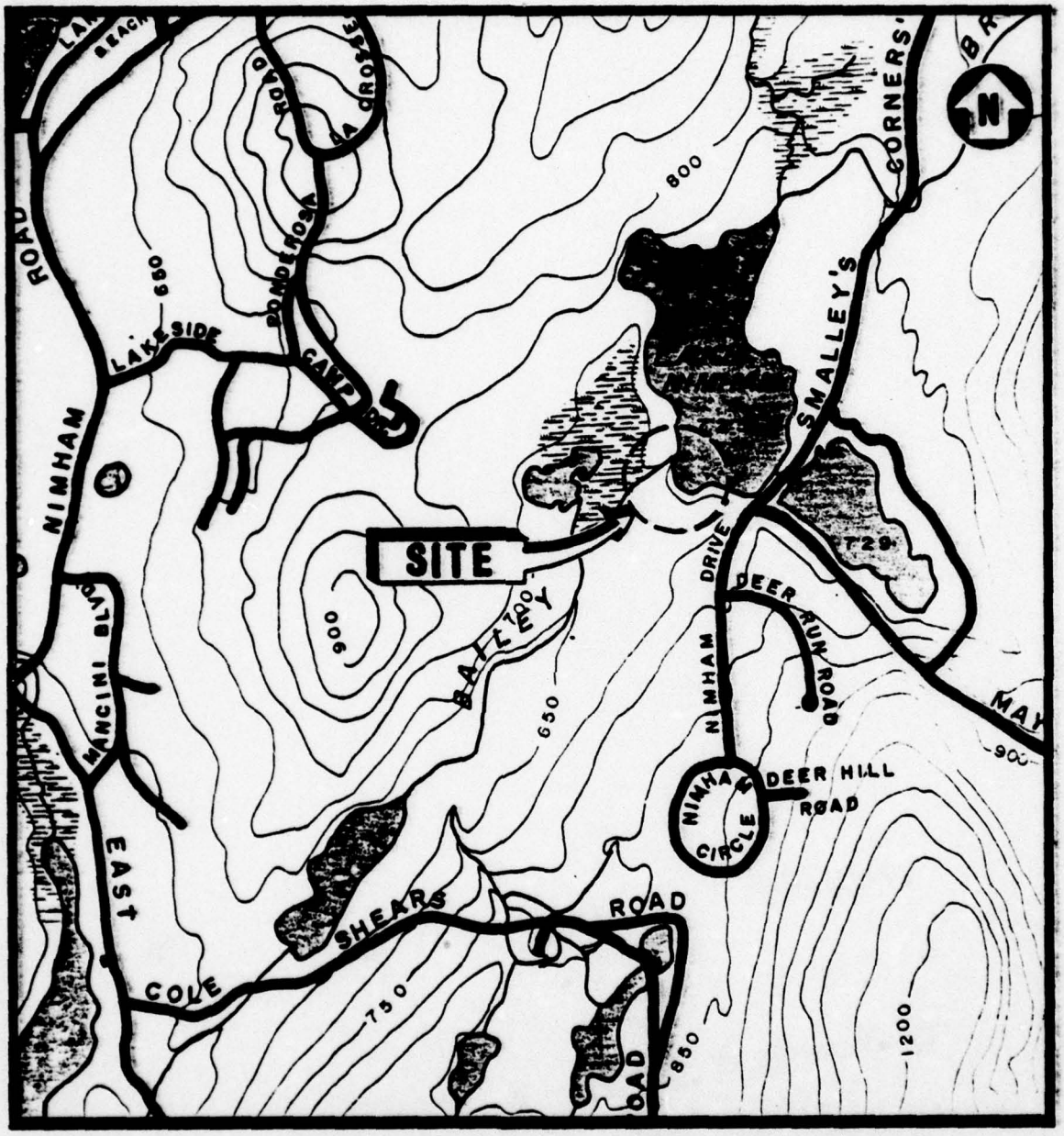
Date August 26, 1967

Addressed to J.L.F. No. 1

LAKE NINHAM

Spillway Modification
Town of Kent, Putnam County
Owner: Realty Equities Putnam Corp.
Engineer - R.D. Essert
Date of plans: Prelim. plans, Plan 1/23/67
Rev. 6/16/67
Rev. 8/16/67

JOSEPH S. WARD & ASSOC.
CONSULTING ENGINEERS
PLATE III JULY 1978



SCALE: 1"=1100'±

MAP SOURCE: BASE MAP WAS ADAPTED FROM A MAP PREPARED AT THE DIRECTION OF THE KENT TOWN BOARD, BY STEPHEN A. ESTRIN, DATED MARCH 24, 1973, ENTITLED "TOWN OF KENT, NEW YORK." (BASE MAP MAY NOT REFLECT RECENT CARTOGRAPHIC CHANGES).

PLATE IV UPDATED LOCATION MAP

APPENDIX A

CHECKLIST - ENGINEERING DATA

CHECKLIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

NAME OF DAM: Lower Lake Nimham NDS ID NO.: NY137

RATED CAPACITY (ACRE-FEET) 200 NYS DEC ID NO.: 231-3519A

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 725

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 727

ELEVATION MAXIMUM DESIGN POOL: 729

ELEVATION TOP DAM: 729

CREST: (Emergency Spillway)

a. Elevation 727
b. Type Vegetated earth
c. Width 37 Feet (Bottom); 50 Feet (Top)
d. Length 38 Feet
e. Location Spillover Near left abutment
f. Number and Type of Gates None

OUTLET WORKS:

a. Type Drop inlet overflow spillway/2-48 inch diameter pipes
b. Location Near center of dam
c. Entrance inverts 725 (Weir) ; 712.5 (RC Pipe)
d. Exit inverts 712.5 (RC Pipe)
e. Emergency draindown facilities 2-12 inch diameter drains connected to overflow spillway via 2-24 inch gates.

HYDROMETEOROLOGICAL GAGES:

a. Type None
b. Location None
c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: Unknown

CHECKLIST

ENGINEERING DATA

DESIGN, CONSTRUCTION, AND OPERATION
PHASE I

NAME OF DAM: Lower Lake Nimham Dam

NDS ID NO.: NY137 NYS DEC ID NO.: 231-3519A

ITEM	REMARKS
DRAWINGS	Two design drawings available: 1) Structure as rebuilt in 1954 (revised twice in 1955) 2) Structure as modified in 1966 (revised once in 1966 and three times in 1967)
REGIONAL VICINITY MAP	USGS 7.5' Quad - Lake Carmel, NY (N4122.5/W7337.5) Town of Kent Official Map - Prepared in 1973 at direction of Kent Town Board.
CONSTRUCTION HISTORY	No formal history available. Some information contained in correspondence between previous owners and NY State agencies.
TYPICAL SECTIONS OF DAM	Available on both of the drawings listed above.
HYDROLOGIC/HYDRAULIC DATA	No data available. Some computations submitted with initial application for construction in 1954. Additional computions submitted with application for reconstruction in 1967.

ENGINEERING DATA

ITEM	REMARKS
OUTLETS; Plan Details Constraints Discharge Ratings	Details of drop inlet spillway shown on 1954 drawing. No constraints noted. No discharge ratings available.
RAINFALL/RESERVOIR RECORDS	None available - had to be generated as part of this study.
DESIGN REPORTS	None
GEOLOGY REPORTS	None available - had to be generated as part of this study.
DESIGN COMPUTATIONS; Hydrology & Hydraulics Dam Stability Seepage Studies	Hydrology and hydraulics: as noted on Sheet 1 under "Hydrologic/Hydraulic Data" Dam stability and seepage studies: none available.

ENGINEERING DATA

ITEM	REMARKS
MATERIALS INVESTIGATIONS Boring Records Laboratory Field	Boring logs of embankment near drop inlet spillway are available. These borings were performed by NYSDPW, Bureau of Soil Mechanics.
POST-CONSTRUCTION SURVEYS OF DAM	Inlet structure only, 12-3-65.
BORROW SOURCES	Not available
MONITORING SYSTEMS	None
MODIFICATIONS	Modifications to original structure are shown on 1966 drawing. Main modifications: addition of emergency spillway, raising crest of dam by 1.5 feet, installing impermeable blanket on upstream slope and about 50 feet on lake bottom.

ENGINEERING DATA

ITEM	REMARKS
HIGH POOL RECORDS	None available
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Results of investigations following the first two failures are contained in correspondence between NY State Agencies and previous owners.
PRIOR ACCIDENTS OR FAILURE OF DAM Description Reports	There were two previous failures: 1) In 1955 a break occured at about the center of the dam 3 or 4 feet above the 2-48 inch overflow pipes. (Refer to Tallamy's letter of 11 July 1955, Appendix E.) (Refer to Sheet 5)
MAINTENANCE AND OPERATION RECORDS	None available
SPILLWAY; Plan Sections Details	Drop inlet spillway: on 1954 drawing. Emergency spillway: on 1965 drawing.

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT: Plans Details	No engineering data available. Control wheel or wrench could not be located.
PREVIOUS INSPECTION Date; Findings	Inspections are performed periodically by NYSDEC. The last one was on 24 September 1971: "New structure in good condition." (Refer to Appendix E.)
PRIOR ACCIDENTS OR FAILURE OF DAM Description Reports	2) In 1965 a washout to the right of the concrete box inlet produced a trapezoidal breach measuring about 10 feet wide at the top, 5 feet wide at the bottom and 10 feet deep. (Refer to Peck's memo to Hudowalski dated 19 March 1965 - Appendix E.)

APPENDIX B

CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

NAME OF DAM: Lake Nimham / Bailey Brook County: Putnam State: NY NDS ID No.: NY137 NYS DEC ID No.: 231-3519A

Type of Dam: Earthfill Hazard Category: Significant

Date(s) Inspection: 30 June 1978 Weather: Clear Temperature: 80°F

Pool Elevation at Time of Inspection: 725 msl

Tailwater at Time of Inspection: 711.8 msl

Inspection Personnel:

E. A. Nowatzki (JSW) Harry Ward (Town of Kent) - visitor

S. R. Remz (JSW)

G. S. Salzman (JSW)

E. A. Nowatzki Recorder

Remarks:

EMBANKMENT

Sheet 1 of 3

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None noticeable - embankment very heavily vegetated.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None visible	
SLOUGHING OR EROSION: Embankment Slopes Abutment Slopes	Left downstream embankment: minor surface erosion in area of no vegetative cover (20' left of left outlet pipe) (Refer to Sheet 3)	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Both appear OK. Very heavily vegetated. Foot path clear-alignment along it OK.	
RIPRAP FAILURES	No riprap on embankment. Minor riprap around inlet chimneys OK.	

EMBANKMENT

Sheet 2 of 3

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT WITH: Abutment Spillway Other Features	Abutment: not sharply defined - estimated on basis of age of vegetation - OK. Principal spillway (chimneys): OK. Emergency spillway: apparently cut (See below)	
ANY NOTICEABLE SEEPAGE	Standing water among boulders on downstream face about 15' to right of stream channel. May or may not be (Refer to Sheet 3)	
RECORDING INSTRUMENTATION	None	
DRAINS	None	
JUNCTION OF EMBANKMENT WITH: Abutment Spillway Other Features	in virgin ground only 1' below crest of embankment; looks OK.	

EMBANKMENT

Sheet 3 of 3

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOUGHING OR EROSION: Embankment Slopes Abutment	Right downstream abutment: noticeable erosion of virgin soil.	
ANY NOTICEABLE SEEPAGE	seepage. Probably flow from outlet diverted around boulders lining stream channel.	

OUTLET WORKS

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Right outlet conduit: OK Left outlet conduit: Longitudinal crack in crown (1/4" opening.) Both pipes sagging from about 3/4 Refer to Sheet 2)	
INTAKE STRUCTURE	Twin chimneys: minor scaling. Gate boxes covered by wood planks; filled to lake elevation; could not see (Refer to Sheet 2)	
OUTLET STRUCTURE	See comments under "Outlet Conduit" above	
OUTLET CHANNEL	See comments under "Outlet Conduit" above. Boulder blockage at outlet headwall. Water ponded to 9" above inverts of pipes.	
EMERGENCY GATE	Slight leakage through 24" gate. Controls look as though they haven't been used in many years - rusted.	Gate wheels could not be located so gates could not be opened.

OUTLET WORKS

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	point from upstream inlet. Minor scaling of downstream headwall and wingwalls.	
INTAKE STRUCTURE	down them. Slight seepage through gates. Reinforcing steel trash racks cover chimneys; OK.	

UNGATED SPILLWAY

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See comments "EMBANKMENT Junction of Embankment with Spillway."	
APPROACH CHANNEL	Approach channel to emergency spillway blocked; very heavy, woody vegetation.	Trim vegetation
DISCHARGE CHANNEL	Discharge channel from emergency spillway same as approach channel and obstruction by 6'-diameter boulder	Trim vegetation; remove boulder.
BRIDGE AND PIERS	None	

INSTRUMENTATION

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

DOWNSTREAM CHANNEL

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION Obstructions Debris Other	Major obstructions: boulders and trees. Minor debris (fallen trees.)	Remove fallen trees
SLOPES Cover Stability	Wooded slopes - some boulders; no stability problems evident. Slopes on an average of 2.5 horizontal to 1 vertical.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	One or possibly two homes may be affected downstream of unnamed private lake which is downstream of Lake Nimham and upstream of Boyd's Corner Reservoir.	Assign "significant" hazard classification and re-evaluate within next five years.

RESERVOIR

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Average slopes: 4 horizontal to 1 vertical around perimeter of lake except for causeway between upper and lower Lake Nimham where slopes (See below)	
SEDIMENTATION	No significant sedimentation visible.	
OTHER	Connection between Upper and Lower Lake Nimham is through causeway by 30" pipe; not visible. Inlet and outlet ends of pipe submerged.	
	Inlet end is in a square 4' x 4' drop inlet (steel trash rack.) Measured about 50" elevation difference between upper and lower lakes.	
SLOPES	are about 2 horizontal to 1 vertical.	

APPENDIX C

COMPUTATIONS

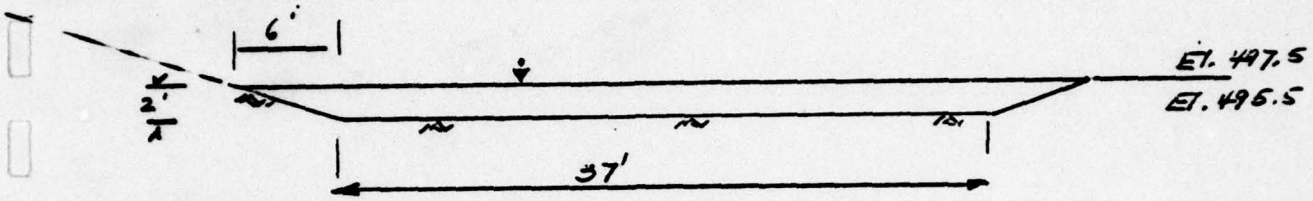
JOSEPH S. WARD

BY EAG DATE 13 July 1978 | 91 ROSELAND AVE. CALDWELL, N. J. | SHEET NO. 1 OF 6

CHKD. BY SRA DATE 21 July 78 GSS 8-30-78 | JOB NO. A7805-11.B

SUBJECT Lake Nimham - Hydraulics

Capacity of spillway



Assume continuous slope of 3 vertical to 100 horizontal (Drawing shows a step slope with control section at level grade)

Use Mannings formula

$$Q = \frac{1.486}{n} \cdot a \cdot r^{2/3} \cdot s^{1/2}$$

a = cross-sectional area in ft^2 = $6 \times 2 + 37 \times 2 = 86\ ft^2$

r = hydraulic radius = $\frac{a}{p} = \frac{86\ ft^2}{37 + 6.32_{\times 2}} = \frac{\cancel{1.99}}{1.73}$

$r^{2/3} \simeq \cancel{1.58}$ 1.44

s = energy gradient (assume equal to bed slope) = 3/100

$s^{1/2} \simeq 0.173$ ✓

n = Manning roughness coefficient

For canals with rough beds and weeds on sides

$0.025 \leq n \leq 0.04$

For very weedy natural streams

$0.075 \leq n \leq 0.15$

Using limits:

@ $n = 0.025$, $Q \simeq \frac{1273}{\cancel{1397}}$ c/s. (If well maintained)

@ $n = 0.150$, $Q \simeq \frac{\cancel{233}}{212}$ c/s. (If poorly maintained)

JOSEPH S. WARD

BY EAN DATE 13 July 1976 — 91 ROSELAND AVE. CALDWELL, N. J. — SHEET NO. 2 OF 6

CHKD. BY SRR DATE 24 July 1976 — JOB NO. A7805-11B

SUBJECT Lake Nimham - Hydraulics

Consider present condition of spillway (heavily overgrown with trees & brush — large boulders in downstream portion)

Method of computing mean n for a channel

USBUREC, Design of Small Dams, p. 577

0.010	Basic n for earth channel
0.005	Minor irregularity
0.000	Gradual change in cross section
0.060	Severe effect of obstructions (roots, rocks, etc.)
0.100	Very high effect of vegetation
n = 0.175	

In its present condition, channel will pass

$Q = 200$ cfs.

Drop inlet Spillway

For small heads, flow over drop inlet spillway is governed by characteristics of crest discharge.

Consider drop inlet as 12' x 3' with an anti vortex baffle in the middle ($A = 12 \times 3 = 36\ ft^2$)

Spillway pipes are 4' in diameter

$$A = 2\left[\frac{\pi(4)^2}{4}\right] = [12.6]2 \doteq 25\ ft^2 \checkmark$$

Riser flow area should be at least 1.5 times barrel flow area

$$25 \times 1.5 \doteq 37.7 \geq 36 \quad \therefore \text{OK}$$
$$37.5$$

Estimate inflow over riser crest

1) Assume rectangular shape acts like a circular pipe of equal area

$$\frac{\pi D^2}{4} = 36\ ft^2$$

$$D = \sqrt{\frac{36\ ft^2 \times 4}{\pi}} = 6.8\ ft \checkmark$$

$\therefore R_s = 3.4\ ft$

$H_o = 4\ ft$ (height of water above riser crest with water at crest of dam)

$$\therefore \frac{H_a}{R_s} = \frac{4}{3.4} \doteq 1.2 \checkmark$$

The coef $C_o \doteq 1.8$ (BUREC Design of Small Dams, Fig 283 p. 417)

$$1.8 = \frac{Q}{2\pi R_s H_o^{3/2}} \quad \text{or} \quad Q = 1.8 \times 2\pi (3.4)\, 4^{3/2}$$

$$Q = 308\ cfs. \checkmark$$

When $H_o/R_s \rightarrow 1$, the water surface over the weir is completely submerged. For this and higher stages of H_o/R_s, the flow phenomenon is that of orifice flow. However, the weir formula ($Q = CLH^{3/2}$) is used as a measure of flow through drop inlet entrance regardless of submergence by using a coef. which reflects the flow condition through various H/R_s ranges (Refer to BUREC, Design of Small Dams p. 416,

2) Assume drop inlet is straight weir with L = 24 ft
(not a good assumption since inlet will probably be submerged at H = 4')
$Q = 3.1 L H^{3/2} = 3.1 (24')(4)^{3/2} = 595$ cfs. ✓

3) Assume orifice flow with entrance loss coef = 0.5

$$Q = A\sqrt{\frac{2gH}{K_e}} = 12 \times 3\sqrt{\frac{2(32.2)4}{1+0.5}} \cong 472 \text{ cfs} \checkmark$$

Check inflow capacity of pipe spillway at full flow
(Refer to V.T. Chow, Handbook of Applied Hydrology, p 21-63

$$Q = a\sqrt{\frac{2gH}{1 + K_e + K_b + K_p L}}$$

H = total head = (497.5 - 483) = 14.5 ft
a = cross sectional area of pipe = 12.6 ft²
K_b = coef for bend loss = 0.45 for ⊥ concrete pipe, n = 0.015
K_p = coef for friction loss = 0.00656 for 48" pipe having n = 0.015
K_e = coef for entrance loss = 0.5 for ⊥ junction
L = length of pipe = 57'

$$Q = 12.6 \text{ ft}^2\sqrt{\frac{2(32.2 \text{ ft/sec}^2)\,14.5 \text{ ft}}{1 + 0.5 + 0.45 + 57(0.00656)}}$$

$$Q = 12.6 \text{ ft}^2\sqrt{\frac{933.8 \text{ ft}^3/\text{sec}^2}{2.32}} = 12.6 \text{ ft}^2 \times 20\frac{\text{ft}}{\text{sec}} = 253 \text{ cfs} \checkmark$$

Total Q for both pipes ≅ 506 cfs ✓

"Weir" flow controls so that Q of Drop Inlet Spillway is limited to 308 cfs

4) Capacity of twin 12" diameter pipes 32 feet long that lead into gate box and thence to outlet via two 24" diameter gate

$$Q = a\sqrt{\frac{2gH}{1+K_e+K_b+K_pL}}$$

H = total head = (497.5 − 481.5) = 16 ft
$a = \pi(0.5)^2 = 0.79\ ft^2$
K_b = coef for bend loss = 0
K_e = coef for entrance loss = 0.5 for ⊥ junction in
K_p = coef for friction loss = 0.0417 for 12"ϕ pipe having $n = 0.015$
L = 32 ft.

$$\therefore Q = 0.79\,ft^2\sqrt{\frac{2(32.2\ ft/sec^2)\,16\ ft}{1+0.5+0+32(0.0417)}} = 0.79\,ft^2 \times 19\frac{ft}{sec} =$$

$Q = 15$ cfs ✓

∴ Total Q for both pipes ≅ 30 cfs (Assume 24"ϕ gate can pass flow from 12"ϕ pipe)

Therefore maximum flow through pipes would be

$Q_{weir} + Q_{gate} = 308 + 30 = 338$ cfs ✓

BY EMW DATE 14 July 1978 JOSEPH S. WARD SHEET NO. 6 OF 6
CHKD. BY JRR DATE 25 July 1978 91 ROSELAND AVE. CALDWELL, N. J. JOB NO. A7805-11.B
SUBJECT Lake Nimham - Hydraulics OSS 8-30-78

Summary
(SDF = PMF/2)

Design Outflow Capacity W/o Gates Opened

Open Channel Spillway	~~1347~~ cfs	1273
Drop Inlet Spillway	308 cfs	308
Total	~~1655~~ cfs	1,581

PMF flow = 1306 cfs
SDF flow = 653 cfs

∴ Spillways can accomodate PMF flow

Present Outflow Capacity W/o Gates Opened

Open Channel Spillway	200 cfs	
Drop Inlet Spillway	308 cfs	
Total	508 cfs	
SDF flow	= 653 cfs	
PMF flow	= 1306 cfs	

∴ Spillways can handle only 39% of PMF flow
or 78% of SDF flow ✓

Design Outflow Capacity W/ Gates Opened

Open Channel Spillway	~~1347~~ cfs	1273
Drop Inlet Spillway + Gates	338 cfs	338
Total	~~1685~~ cfs	1,611
PMF flow	1306 cfs	
SDF flow	653 cfs	

∴ Spillways + gate capacity > PMF flow

Present Outflow Capacity W/ Gates Opened

Open Channel Spillway	200 cfs
Drop Inlet Spillway + Gate	338 cfs
Total	538 cfs
PMF flow	1306

% PMF flow that can be passed = 41% ✓
% SDF flow that can be passed = 82% ✓

BY JP DATE 7/12/78 SUBJECT HYDROLOGY SHEET NO. 1 OF 2
CHKD. BY SRD DATE 7/12/78 LAKE NIMHAM JOB NO. 79-353
DAM SAFETY INSPECTION A-7805-11 B

DETERMINATION OF PEAK INFLOWS

L = LOWER LAKE NIMHAM
H = UPPER LAKE NIMHAM

AREA	BY PLANIMETER USGS - LAKE CARMEL	FROM NY WATER RES. COMM. APPLICATION	FROM 1965 COE
1+L	750 ac.	—	960 ac
2+H	173 ac.	—	186 ac
L	35 ac	40 ac	—
H	11 ac	—	—
ENTIRE W/S (1+L+2+H)	923 ac.	820 ac	1146 ac

∴ USE 1146 ac. AS MOST CONSERVATIVE CASE

PURCELL ASSOCIATES

BY JD DATE 7/12/79 SUBJECT HYDROLOGY SHEET NO. 2 OF 2
CHKD. BY SRA DATE 7/24/79 LAKE NIMHAM JOB NO. 78-353
DAM SAFETY INSPECTION A-7805-11.b

TRANSPOSE DATA FROM FISHKILL CREEK BASIN (SUB AREA 1)
— LOWER HUDSON RIV. BASIN — p80 —

LAKE NIMHAM w/s = A_1 = 1146 ac = 1.8 sq mi ✓

FISHKILL CR. BASIN (SubAr-1) = A_2 = 76.4 sq mi ("LHR" p81)

PMF = 2(SPF)

PMF_2 = 2(10858) = 21716 cfs ("LHR" p84)

GENERAL TRANSPOSITION FORMULA (CONTACT W/ N.Y. CORP OF ENG)

$$\left(\frac{A_1}{A_2}\right)^{0.75} = \frac{PMF_1}{PMF_2}$$

$$\left(\frac{1.8}{76.4}\right)^{0.75} = \frac{PMF_1}{21,716}$$

∴ PMF_1 = 1306 cfs for the LAKE NIMHAM W/S.

OVERTOPPING POTENTIAL

Q_1 = SPILLWAY CAPACITY = 1340 cfs (WATER RESOURCES COMM. APPLICATION p2.)

Q_2 = PMF PEAK INFLOW = 1306

$Q_1 > Q_2$

∴ LAKE NIMHAM DAM CAN PASS THE PMF AND WILL NOT BE OVERTOPPED

PURCELL ASSOCIATES

BY ERJ DATE 8-30-78 SUBJECT NINHAM LAKE DAM HEC-1 INPUT SHEET NO. 1 OF 7
CHKD. BY DATE JOB NO. 78-353

P CARD - PRECIPITATION DATA

FROM HYDROMETEOROLOGICAL PAPER NO. 33

PMP (200 SM/24HR) = 21 INCH (FIG. 1)

SITE IS IN ZONE 1.

FROM FIG. 2 - USE 10 SM AS MINIMUM AS INDICATED BY COE.

HOURS	% OF 200SM/24 HR
6	110
12	122
24	132
48	144

T CARD - LOSS DATA

USE ONLY A UNIFORM RAINFALL LOSS OF .1 IN/HR AS INDICATED BY COE.

BY ERJ DATE 8-29-78 SUBJECT NIMHAM LAKE HEC-1 INPUT SHEET NO. 2 OF 7
CHKD. BY DATE JOB NO. 78-353

W CARD

SNYDER'S UNIT HYDROGRAPH COEF.

LAG TIME: $T_p = C_T (L \times L_{CA})^{.3}$

C_T = SLOPE/STORAGE COEF. = 1.8 - 2.2 USE 2.0 *

L = LENGTH OF MAIN CH. = 1.7 mi

L_{CA} = LENGTH OF MC TO CENTROID OF DRAINAGE AREA = .75 mi

$T_p = 2.0 (1.7 \times .75)^{.3} = \underline{2.15 \text{ hr.}}$

PEAKING COEF: C_p = .4 - .8 USE .625 * AVG. VALUE FOR

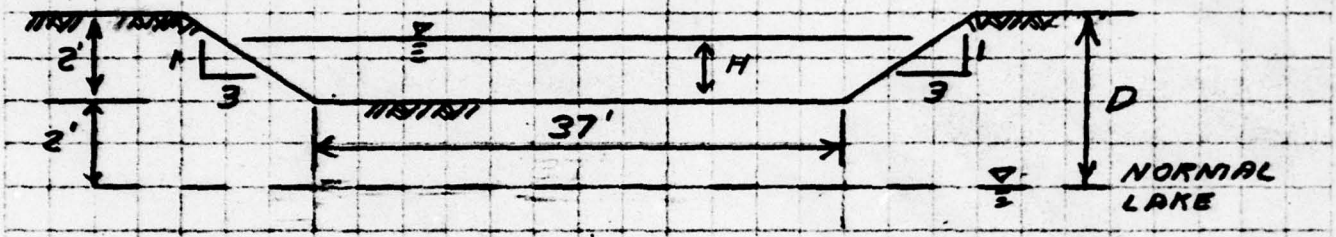
* AVG. VALUES FOR APPALACHIAN HIGHLAND AREA (SNYDER)

X CARD

BASE FLOW - ASSUME NONE.

PURCELL ASSOCIATES

CALCULATE STAGE-DISCHARGE FOR DAM



USE MANNINGS FORMULA

$$Q = \frac{1.486}{N} A R^{2/3} S^{1/2}$$

A = AREA IN SQ. FT.

R = HYDRAULIC RADIUS = A/P IN FT.
P = WETTED PERIMETER IN FT

S = SLOPE IN FT/FT = 3/100 = .03 FT/FT

N = MANNINGS COEFF.
= .150 FOR EXISTING CONDITIONS
= .025 FOR WELL MAINTAINED SPILLWAY.

$$A = \left(\frac{6H+37+37}{2}\right)H = 3H^2+37H \qquad H \text{ IN FT.}$$

$$P = 2\sqrt{10}H + 37 = 6.32H + 37 \qquad H \text{ IN FT.}$$

NOTE: OUTLET PIPE DISCHARGE OF 338 CFS IS TO BE ADDED TO SPILLWAY DISCHARGE FOR TOTAL DISCHARGE

BY ERJ DATE 9-1-78 SUBJECT NINHAM LAKE SHEET NO. 4 OF 7
CHKD. BY ____ DATE ____ HEC-1 INPUT JOB NO. 78-353

STAGE DISCHARGE

B	H	A	P	R	Q TOTAL N=.025	Q TOTAL N=.15
0	-	-	-	-	-	-	303	303
.5	-	-	-	-	-	-	338	338
1.0	-	-	-	-	-	-	338	338
1.5	-	-	-	-	-	-	338	338
2.0	0	0	0	0	308	301	338	338
2.5	.5	19.25	40.16	.479	121	20	459	358
3.0	1.0	40	43.32	.923	390	65	728	403
3.5	1.5	62.25	46.49	1.34	779	130	1117	468
4.0	2.0	86	49.65	1.73	1276	213	1614	551

PURCELL ASSOCIATES

BY ERJ DATE 9-1-78 SUBJECT NIMHAM LAKE SHEET NO. 5 OF 7

CHKD. BY ____ DATE ____ JOB NO. 78-353

CALCULATE STAGE STORAGE FOR LAKE

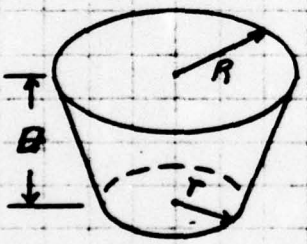
ASSUMPTIONS - 3 ON 1 SIDE SLOPES OF LAKE SHORE
- ASSUME CIRCULAR LAKE FOR CALCULATIONS
- CONSIDER ONLY LOWER LAKE FOR STORAGE AS UPPER LAKE IS 4' HIGHER

AREA OF NORMAL LAKE ($D = 0$) = 40 Ac.
= 1,742,400 SF

CALCULATE RADIUS OF NORMAL LAKE

$A = \pi R^2 \therefore R = (A/\pi)^{1/2} = 745'$

VOLUME OF INCREMENTAL INCREASE IN H



$V = \frac{\pi}{3} D (r^2 + rR + R^2)$ IN C.F.

$r = 745'$ IN FT

$R = 3D + 745$ IN FT

BY ERJ DATE 9-1-78 SUBJECT NIMHAM LAKE HEC-1 INPUT SHEET NO. 6 OF 7
CHKD. BY DATE JOB NO. 78-353

STAGE STORAGE

		VOLUME	
S	R	CU. FT	ACRE-FT
0	745	0	0
.5	746.5	873600	20.1
1.0	748	1750700	40.2
1.5	749.5	2631300	60.5
2.0	751	3515500	80.7
2.5	752.5	4403200	101.1
3.0	754	5294400	121.5
3.5	755.5	6189200	142.1
4.0	757	7087600	162.7

BY ERJ DATE 9-1-78 SUBJECT NIMHAM LAKE HEC-1 INPUT SHEET NO. 7 OF 7
CHKD. BY DATE JOB NO. 78-353

STORAGE (Y2 CARD) : DISCHARGE (Y3 CARD)

D	STORAGE	DISCHARGE N=.035	DISCHARGE N=.150
0	0 Ac-FT	0 CFS	0 CFS
.5	20.1	338	338
1.0	40.2	338	338
1.5	60.5	338	338
2.0	80.7	338	338
2.5	101.1	459	358
3.0	121.5	728	403
3.5	142.1	1117	468
4.0	162.7	1614	551

PURCELL ASSOCIATES
ENGINEERS • ARCHITECTS • PLANNERS

MEMORANDUM OF CONVERSATION

JOB NIMHAM DAM JOB No. 78-353

DATE 8-31-78 TIME 1:30

THE WRITER SPOKE TO:

Mr. TOM SMYTH OF COE

(212)-264-9090

BY TELEPHONE, AT

CONCERNING: HEC-1 INPUT FORMAT

AND DECIDED:

1. LOSS RATE (T-1 CARD) OF .1 IN/HR IS TO BE USED

2. HYDROMETEOROLOGICAL REPORT #33
   a) USE 10 SM (FIG 2) AS MINIMUM.
   b) % OF PMP IS FOR 10 SM AREA.

3. THEY WANT PMF AND ROUTING FOR .1, .2, .3, .4, .5, .6, .7, .8, 1.0 PMF

CC:

SIGNED:

E R JOHNSTON
GLASTONBURY

```
**********
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
**********
```

HYDROLOGIC CALCULATIONS - PMF
LOWER LAKE NIMHAM DAM
8-29-78 JOB NO. 78353

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
50	1	-0	-0	-0	-0	-0	2	-0	-0

JOPER	NWT
5	-0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 2 NRTIO= 9 LRTIO= 1

RTIOS= .10 .20 .30 .40 .50 .60 .70 .80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

COMPUTE PMF

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	-0	-0	-0	-0	-0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.80	-0.00	1.80	-0.00	-0.000	-0	1	-0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
-0.00	21.00	110.00	122.00	132.00	142.00	-0.00	-0.00

TRSPC COMPUTED BY THE PROGRAM IS .729

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0.00	-0.00	1.00	-0.00	-0.00	1.00	-0.00	.10	-0.00	-0.00

UNIT HYDROGRAPH DATA
TP= 2.15 CP= .63 NTA= -0

RECESSION DATA
STRTQ= -0.00 QRCSN= -0.00 RTIOR= 1.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 2.64 AND R= 1.40 INTERVALS

UNIT HYDROGRAPH 11 END-OF-PERIOD ORDINATES. LAG= 2.16 HOURS. CP= .62 VOL= 1.00

83. 256. 314. 220. 125. 71. 40. 23. 13. 7.
4.

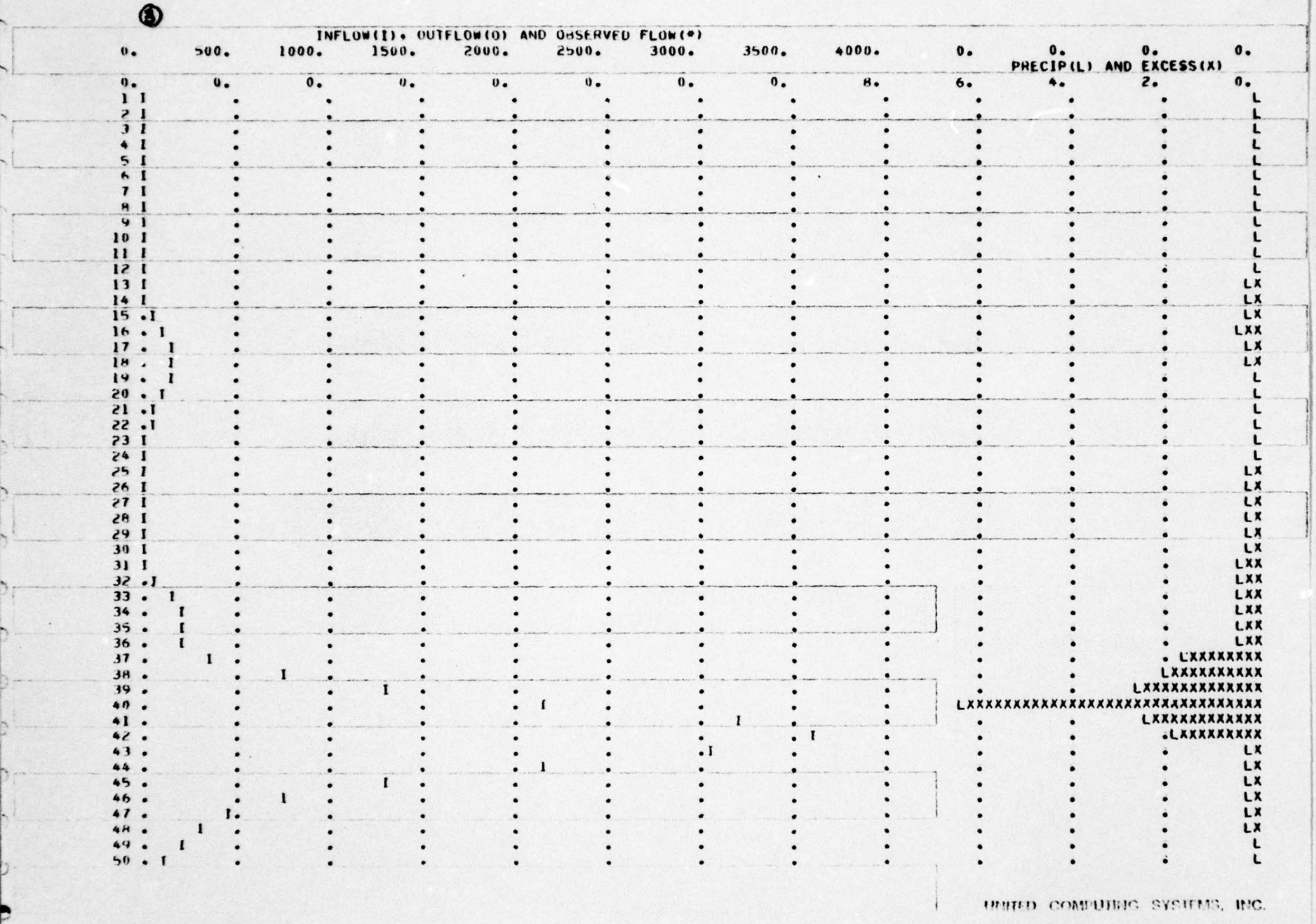
END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	.01	0.00	0.
2	.01	0.00	0.
3	.01	0.00	0.
4	.01	0.00	0.
5	.01	0.00	0.

7	.02	0.00	0.
8	.02	0.00	0.
9	.02	0.00	0.
10	.02	0.00	0.
11	.02	0.00	0.
12	.02	0.00	0.
13	.13	.03	2.
14	.15	.05	11.
15	.19	.09	30.
16	.48	.38	78.
17	.18	.08	149.
18	.14	.04	173.
19	.01	0.00	136.
20	.01	0.00	87.
21	.01	0.00	51.
22	.01	0.00	29.
23	.01	0.00	16.
24	.01	0.00	9.
25	.10	.00	5.
26	.10	.00	3.
27	.10	.00	2.
28	.10	.00	2.
29	.10	.00	2.
30	.10	.00	2.
31	.31	.21	19.
32	.31	.21	72.
33	.31	.21	136.
34	.31	.21	181.
35	.31	.21	206.
36	.31	.21	221.
37	1.68	1.58	343.
38	2.02	1.92	728.
39	2.53	2.43	1292.
40	6.40	6.30	2154.
41	2.36	2.26	3216.
42	1.85	1.75	3606.
43	.15	.05	3062.
44	.15	.05	2141.
45	.15	.05	1310.
46	.15	.05	768.
47	.15	.05	461.
48	.15	.05	284.
49	0.00	0.00	178.
50	0.00	0.00	107.
SUM	21.71	18.47	21272.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3606.	2581.	854.	425.	21272.
INCHES		13.34	17.65	18.32	18.32
AC-FT		1281.	1694.	1759.	1759.

STATION 1


INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0. 500. 1000. 1500. 2000. 2500. 3000. 3500. 4000.
0. 0. 0. 0. 0. 0. 0. 0. 8.
PRECIP(L) AND EXCESS(X)
0. 6. 4. 2. 0.

OVN

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	3.	8.	15.	17.	14.	9.
5.	3.	2.	1.	1.	0.	0.	0.	0.	0.
2.	7.	14.	18.	21.	22.	34.	73.	129.	215.
322.	361.	306.	214.	131.	77.	46.	28.	18.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	361.	258.	85.	43.	2127.
INCHES		1.33	1.76	1.83	1.83
AC-FT		128.	169.	176.	176.

OVF

STATION 1

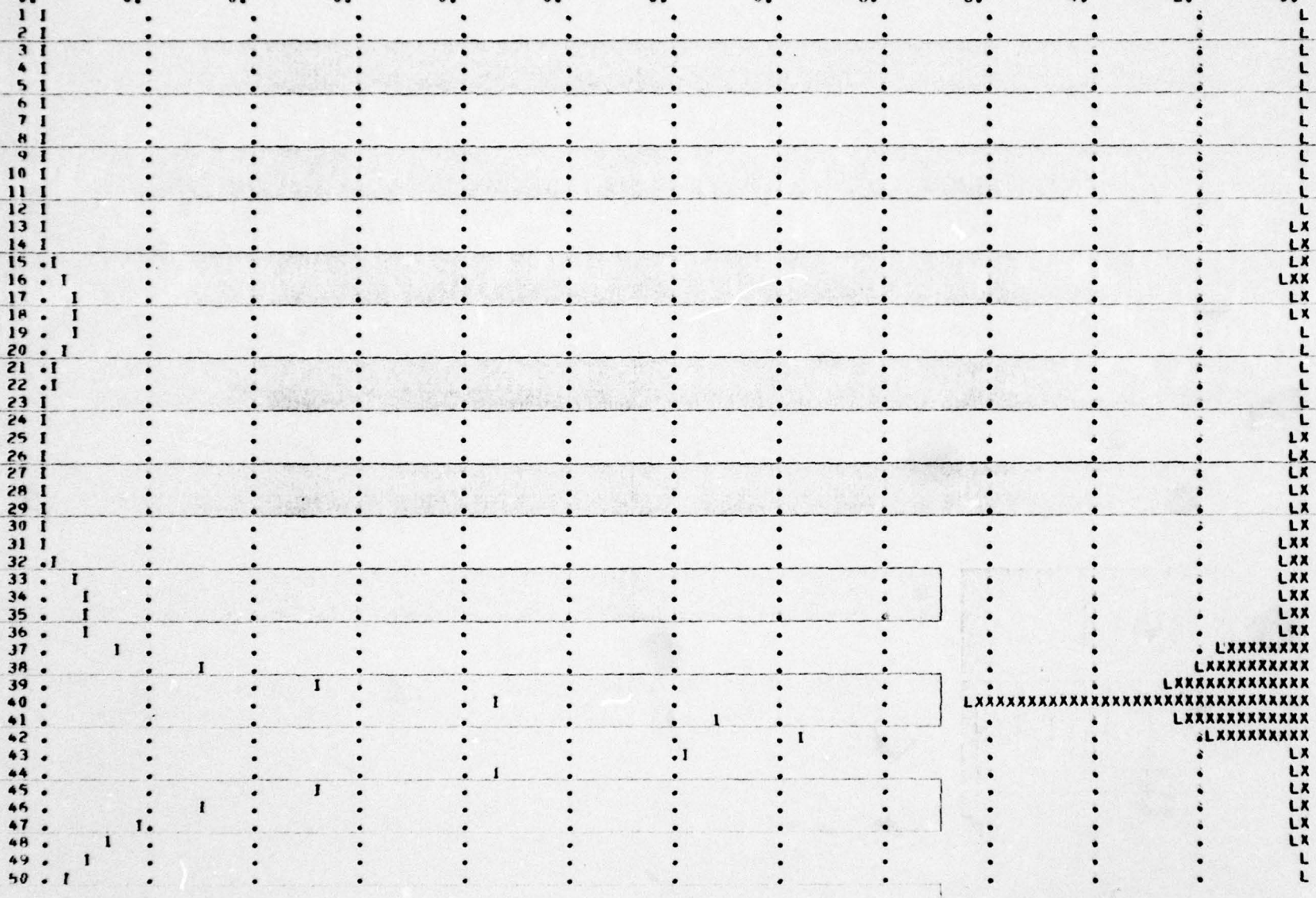
⑤

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0.	50.	100.	150.	200.	250.	300.	350.	400.
0.	0.	0.	0.	0.	0.	0.	0.	8.

0.	0.	0.	0.
6.	4.	2.	0.

PRECIP(L) AND EXCESS(X)



UNIED COMPUTING SYSTEMS, INC.

OVN

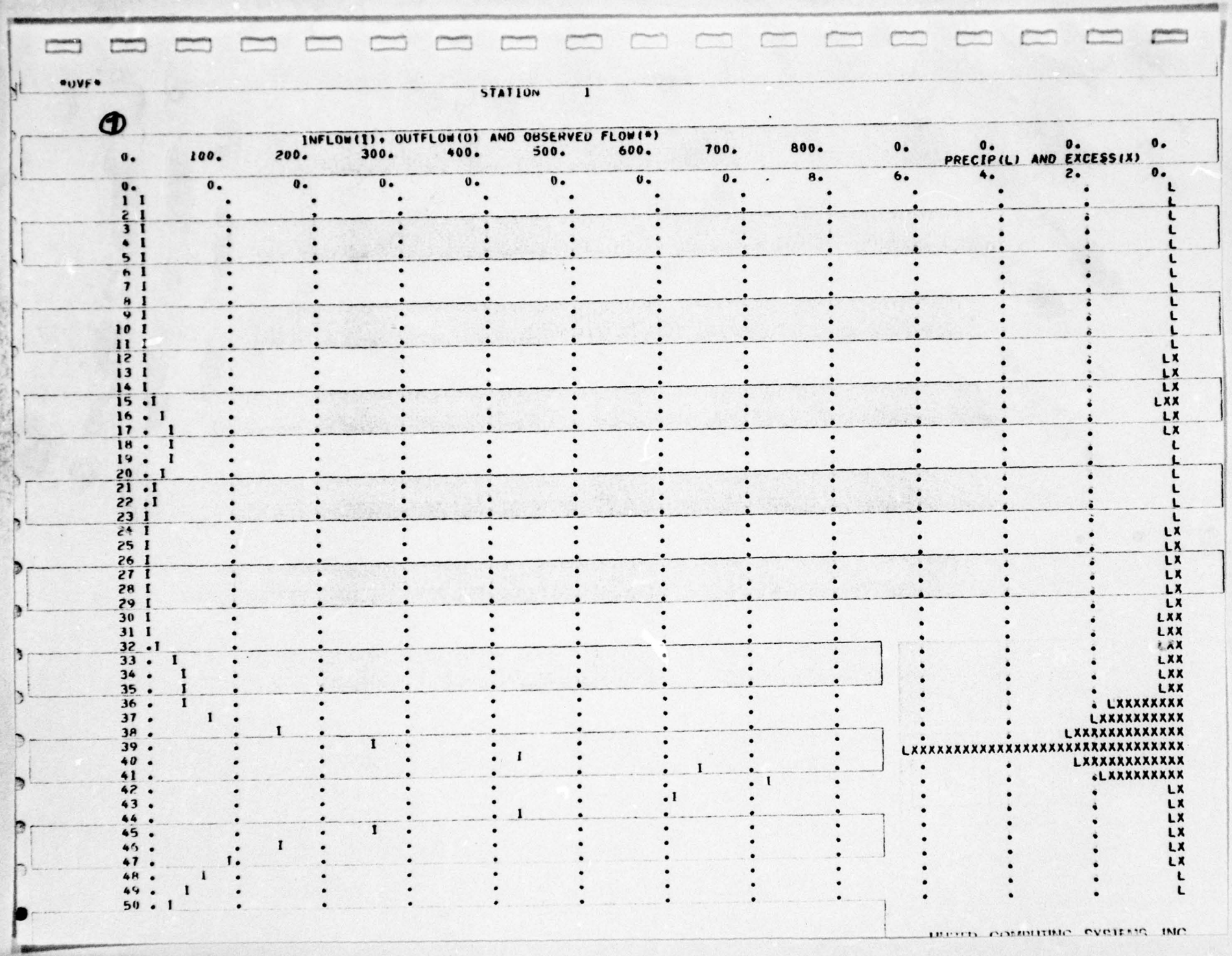
HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	2.	6.	16.	30.	35.	27.	17.
10.	6.	3.	2.	1.	1.	0.	0.	0.	0.
4.	14.	27.	36.	41.	44.	69.	146.	258.	431.
643.	721.	612.	428.	262.	154.	92.	57.	36.	21.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	721.	516.	171.	85.	4254.
INCHES		2.67	3.53	3.66	3.66
AC-FT		256.	339.	352.	352.

OVF

STATION 1



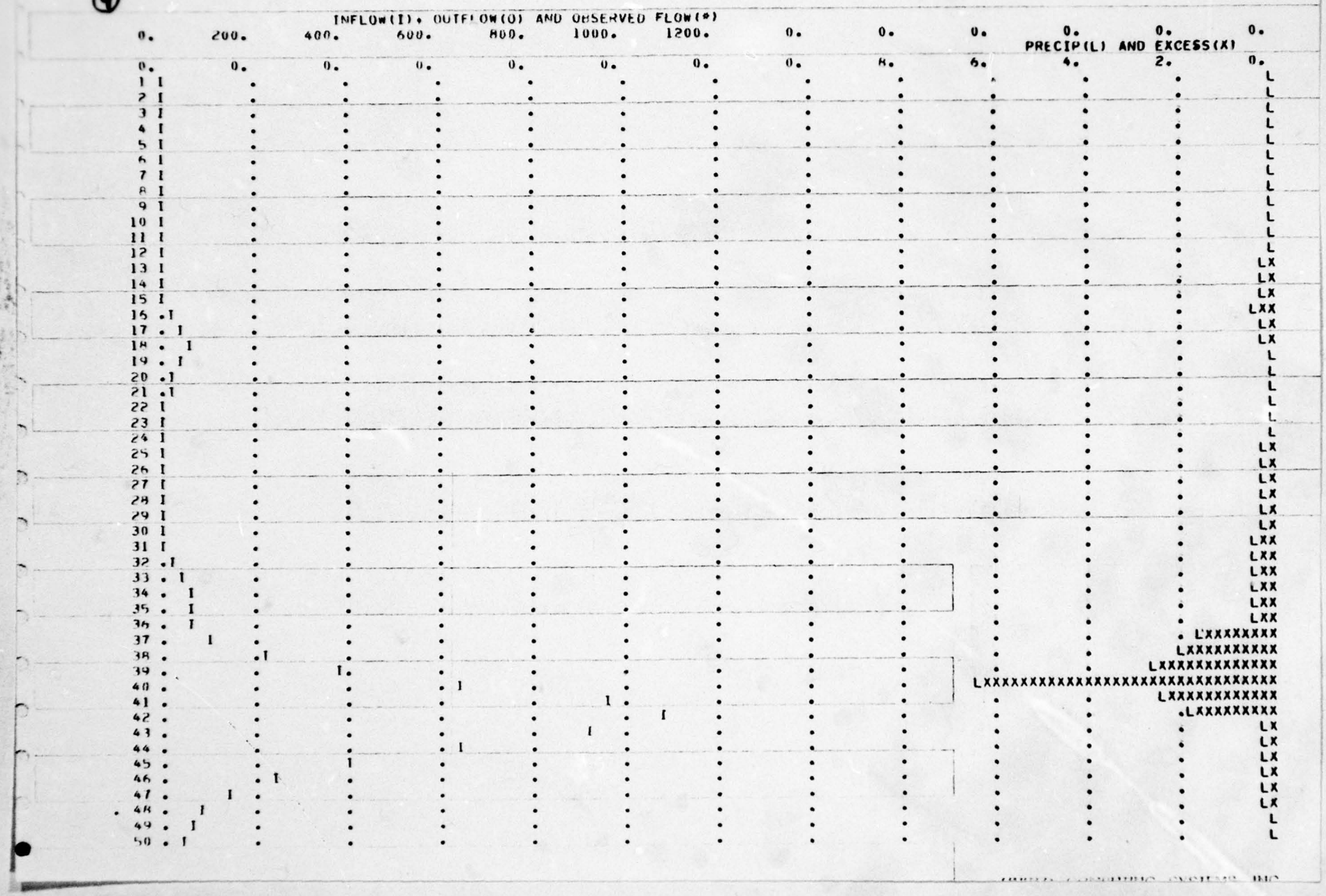
DVN

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	3.	9.	23.	45.	52.	41.	26.
15.	9.	5.	3.	2.	1.	1.	1.	1.	1.
6.	21.	41.	54.	62.	66.	103.	219.	388.	646.
965.	1082.	919.	642.	393.	230.	138.	85.	54.	32.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1082.	774.	256.	128.	6382.
INCHES		4.00	5.29	5.50	5.50
AC-FT		384.	508.	528.	528.

STATION 1


INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0. 200. 400. 600. 800. 1000. 1200.
PRECIP(L) AND EXCESS(X)
0. 2. 4. 6. 8.

DVN

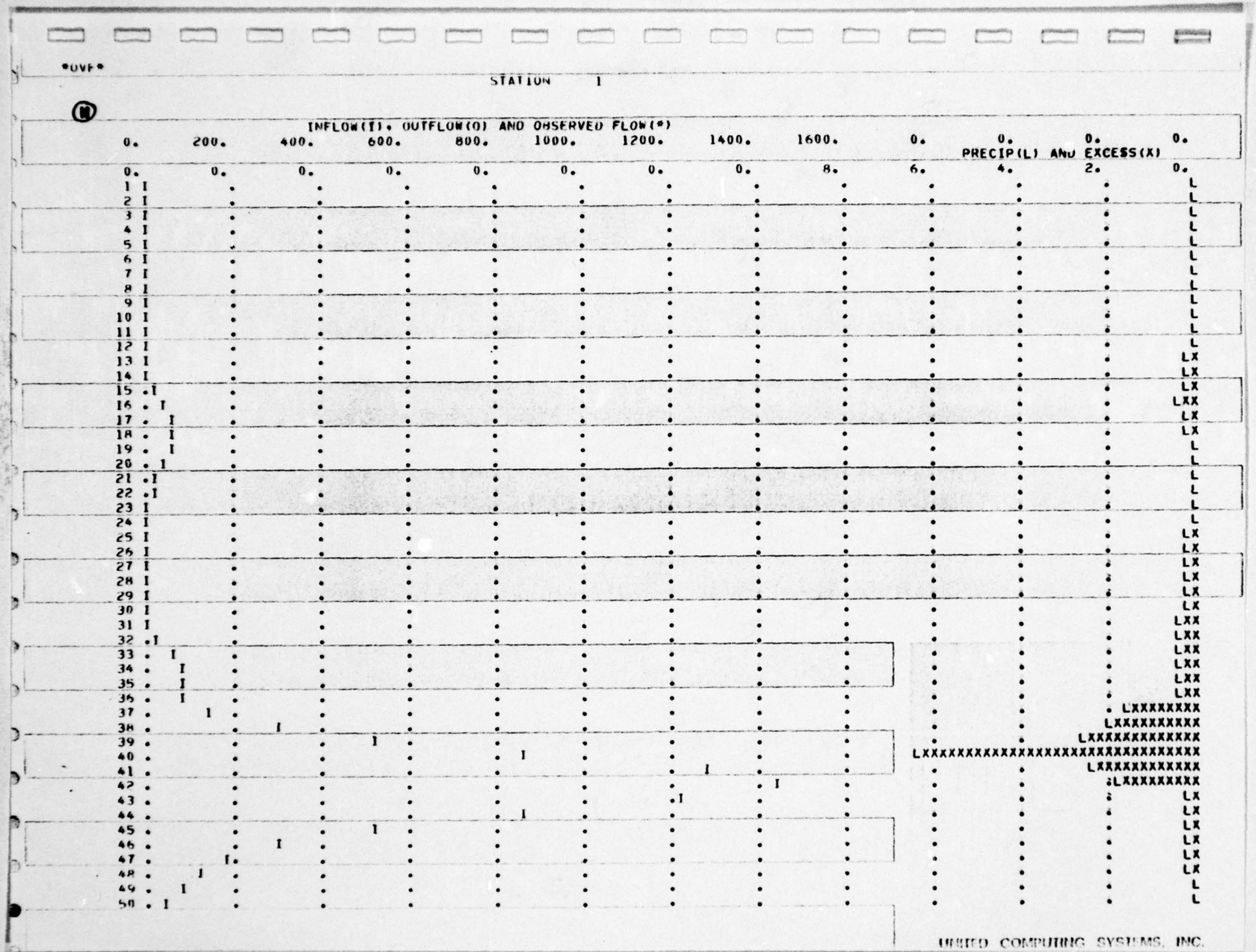
HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	5.	12.	31.	60.	69.	54.	35.
20.	12.	7.	4.	2.	1.	1.	1.	1.	1.
8.	29.	54.	72.	82.	88.	137.	291.	517.	861.
1286.	1442.	1225.	856.	524.	307.	184.	113.	71.	43.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1442.	1033.	342.	170.	8509.
INCHES		5.34	7.06	7.33	7.33
AC-FT		512.	678.	704.	704.

OVF

STATION 1



DVN

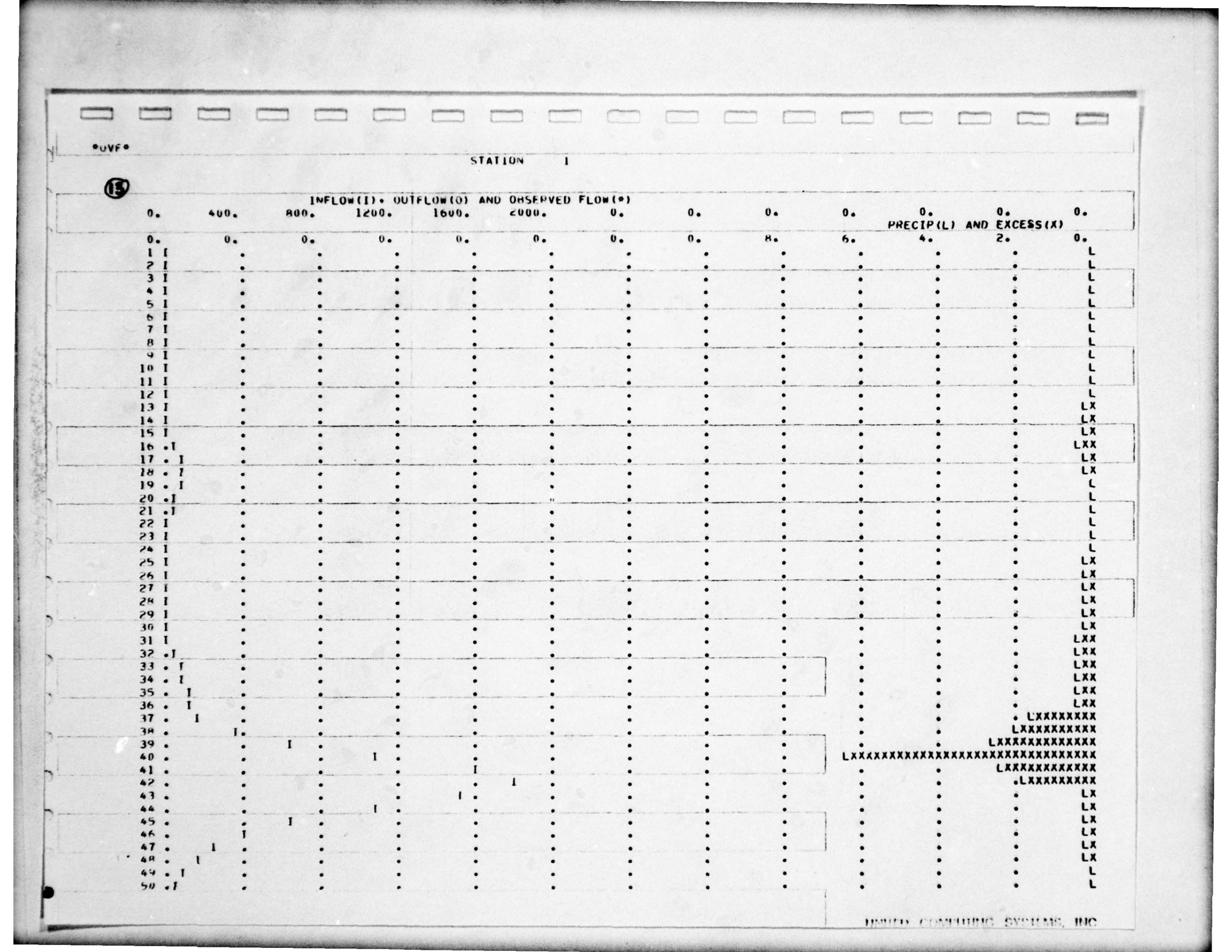
HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 5

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	6.	15.	39.	74.	87.	68.	44.
26.	14.	8.	5.	3.	2.	1.	1.	1.	1.
10.	36.	68.	90.	103.	110.	171.	364.	646.	1077.
1608.	1803.	1531.	1070.	655.	384.	230.	142.	89.	53.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1803.	1291.	427.	213.	10636.
INCHES		6.67	8.82	9.16	9.16
AC-FT		640.	847.	879.	879.

UVF

STATION 1



OVN

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

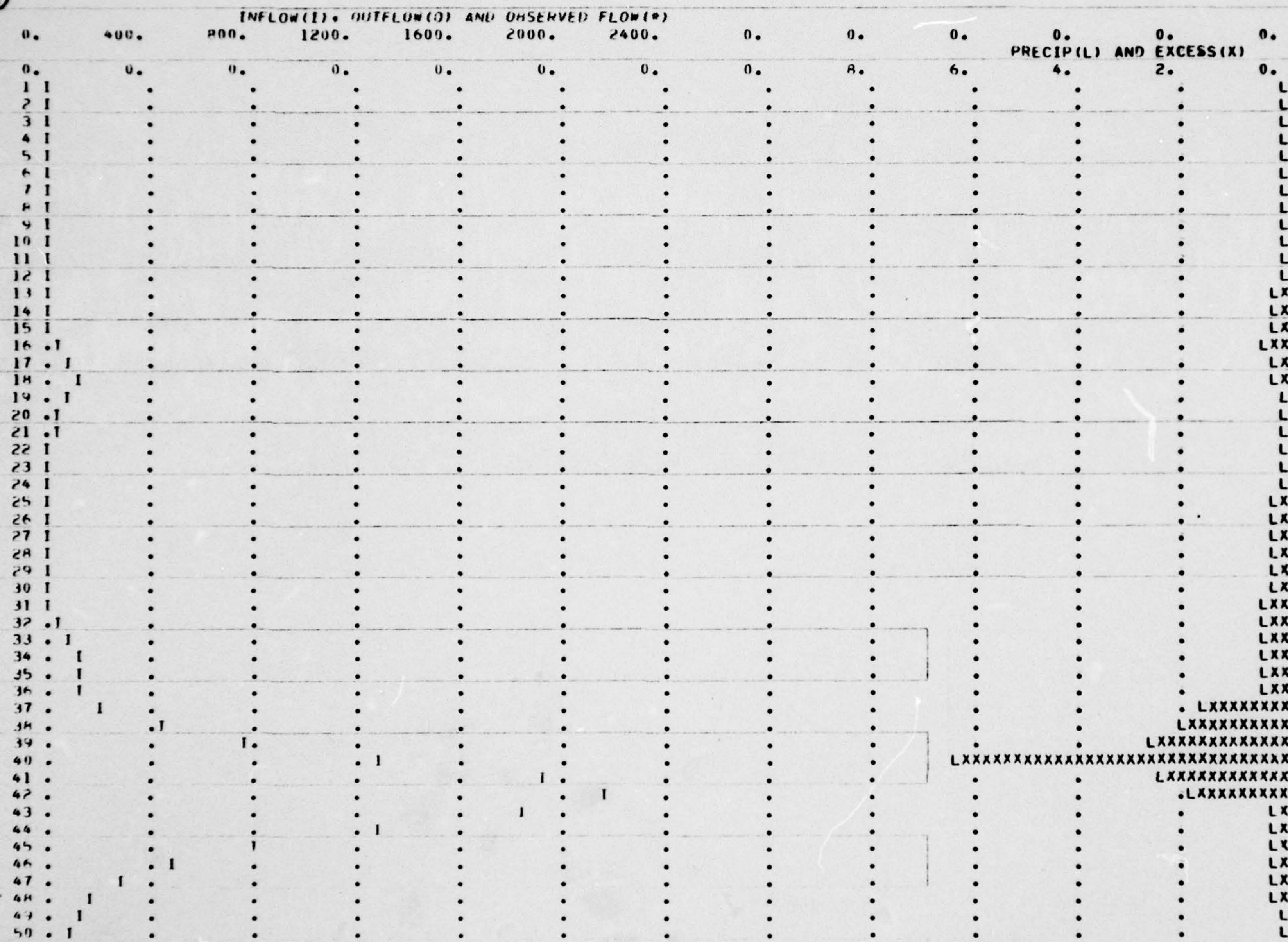
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	7.	18.	47.	89.	104.	82.	52.
31.	17.	10.	6.	3.	2.	1.	1.	1.	1.
12.	43.	81.	108.	124.	132.	206.	437.	775.	1292.
1930.	2164.	1837.	1284.	786.	461.	276.	170.	107.	64.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2164.	1549.	512.	255.	12763.
INCHES		8.00	10.59	10.99	10.99
AC-FT		768.	1017.	1055.	1055.

OVF

STATION 1

(15)



OVN

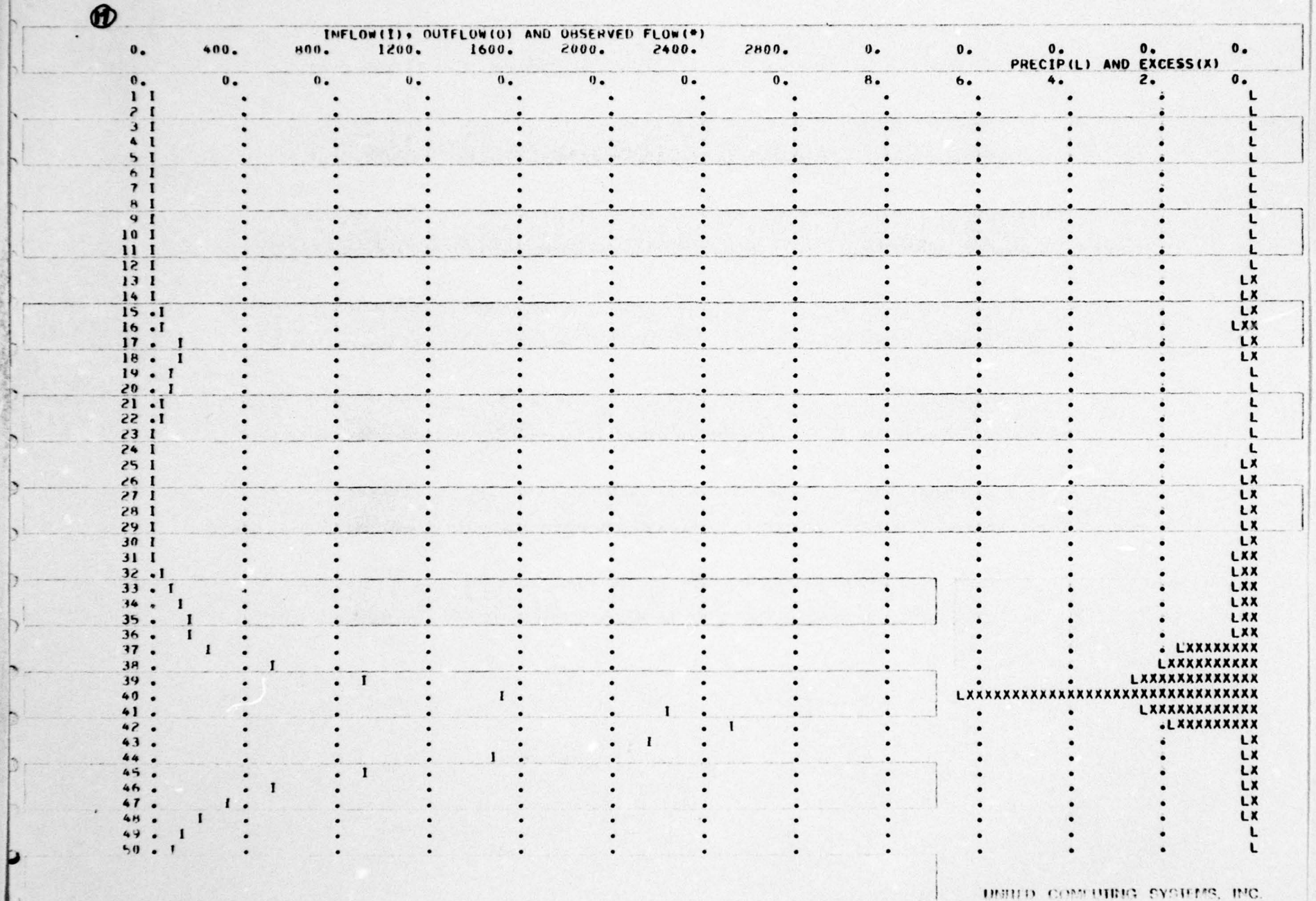
HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 7

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	2.	8.	21.	55.	104.	121.	95.	61.
36.	20.	11.	6.	4.	2.	1.	1.	1.	2.
13.	50.	95.	126.	144.	154.	240.	510.	904.	1508.
2251.	2524.	2144.	1498.	917.	537.	322.	199.	125.	75.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2524.	1807.	598.	298.	14890.
INCHES		9.34	12.35	12.83	12.83
AC-FT		896.	1186.	1231.	1231.

OVF

STATION I



DVN

HYDROGRAPH AT STA I FOR PLAN 1, RTIO 8

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	2.	9.	24.	62.	119.	138.	109.	70.
41.	23.	13.	7.	4.	3.	2.	2.	2.	2.
15.	57.	109.	145.	165.	176.	274.	583.	1034.	1723.
2573.	2885.	2450.	1712.	1048.	614.	368.	227.	143.	85.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2885.	2065.	683.	340.	17017.
INCHES		10.67	14.12	14.66	14.66
AC-FT		1025.	1355.	1407.	1407.

RUN #

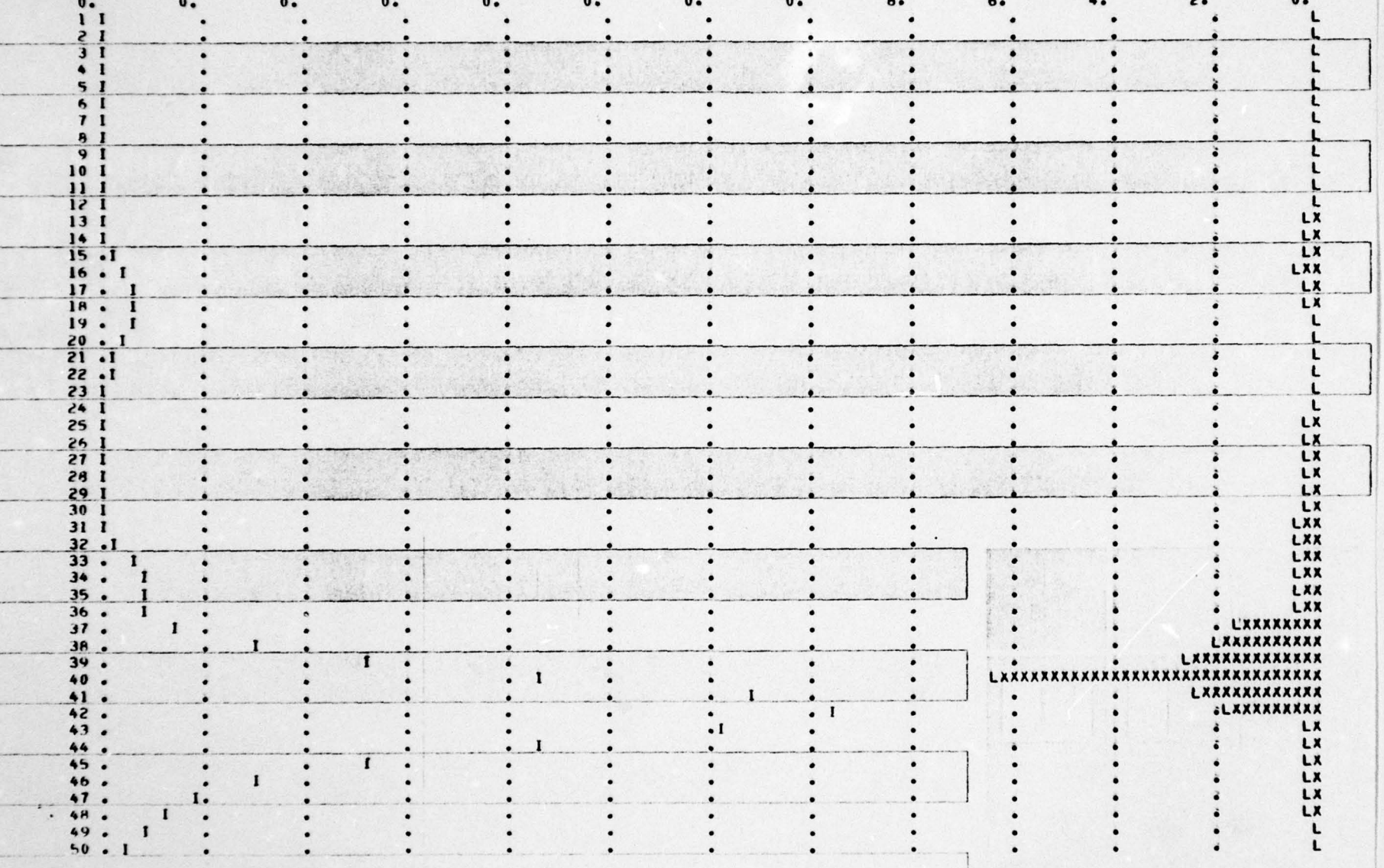
STATION 1

(19)

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0.	400.	800.	1200.	1600.	2000.	2400.	2800.	3200.
0.	0.	0.	0.	0.	0.	0.	0.	8.

0.	0.	0.	0.
PRECIP(L) AND EXCESS(X)			
6.	4.	2.	0.



UNITED COMPUTING SYSTEMS, INC.

OVV

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 9

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	2.	11.	30.	78.	149.	173.	136.	87.
51.	29.	16.	9.	5.	3.	2.	2.	2.	2.
19.	72.	136.	181.	206.	221.	343.	728.	1292.	2154.
3216.	3606.	3062.	2141.	1310.	768.	461.	284.	178.	107.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3606.	2581.	854.	425.	21272.
INCHES		13.34	17.65	18.32	18.32
AC-FT		1281.	1694.	1759.	1759.

OVF

STATION 1

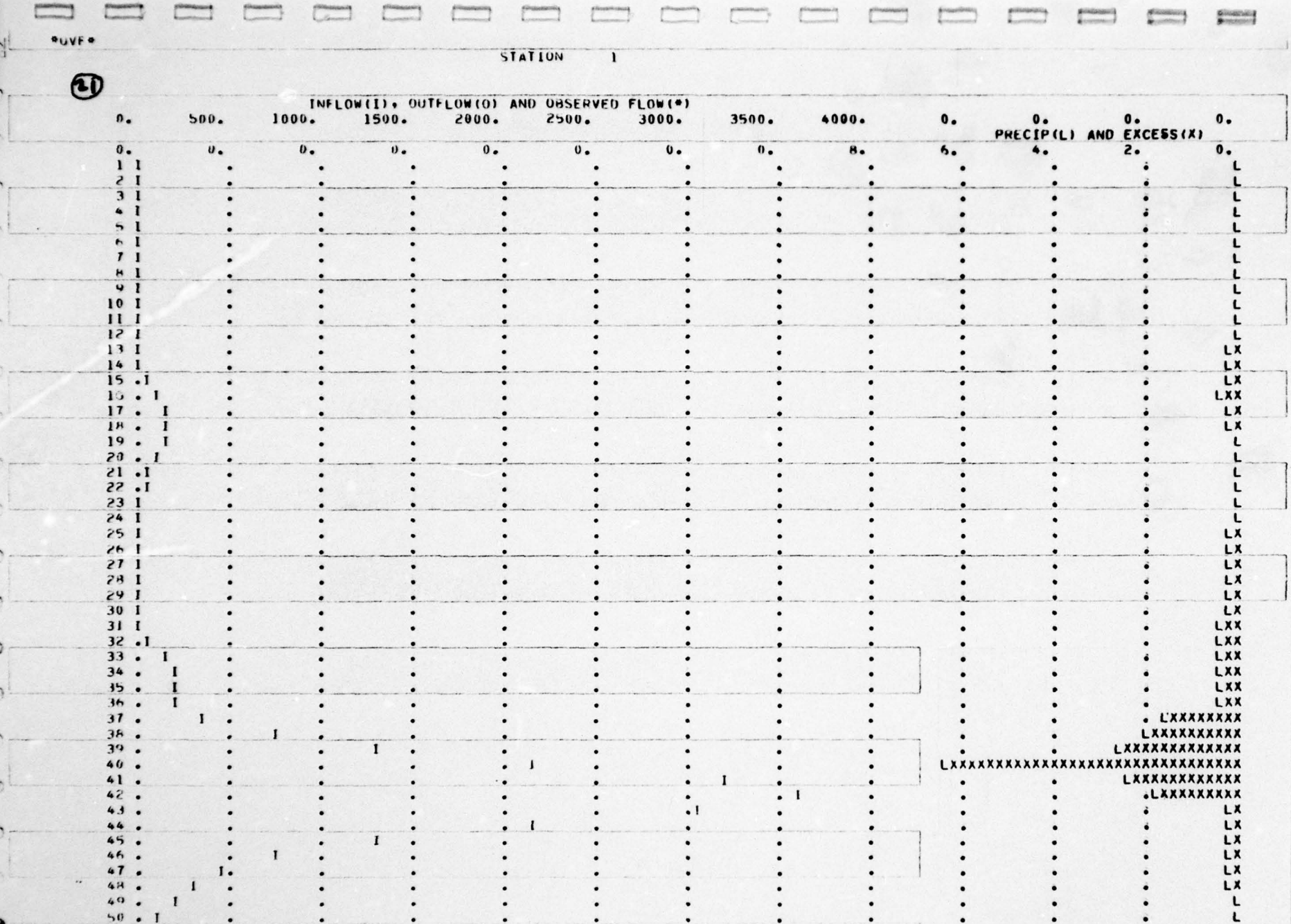
(21)

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0.	500.	1000.	1500.	2000.	2500.	3000.	3500.	4000.
0.	0.	0.	0.	0.	0.	0.	0.	8.

PRECIP(L) AND EXCESS(X)

0.	0.	0.	0.
6.	4.	2.	0.



UNITED COMPUTING SYSTEMS, INC.

OVN
PLAN 2 SAME AS PLAN 1

(22)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE FLOOD THRU LAKE - MAINTAINED CONDITION (N = 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	-0	-0	-0	-0	1

PLAN 1
ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	-0.	20.	40.	60.	81.	101.	121.	142.	163.	-0.
OUTFLOW=	-0.	338.	338.	338.	338.	459.	728.	1117.	1614.	-0.

STATION 1, PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	2.	5.	10.	15.	15.	12.
8.	5.	3.	2.	1.	1.	0.	0.	0.	0.
1.	4.	9.	15.	18.	21.	27.	49.	92.	158.
249.	324.	332.	273.	191.	120.	72.	43.	27.	17.

STOR

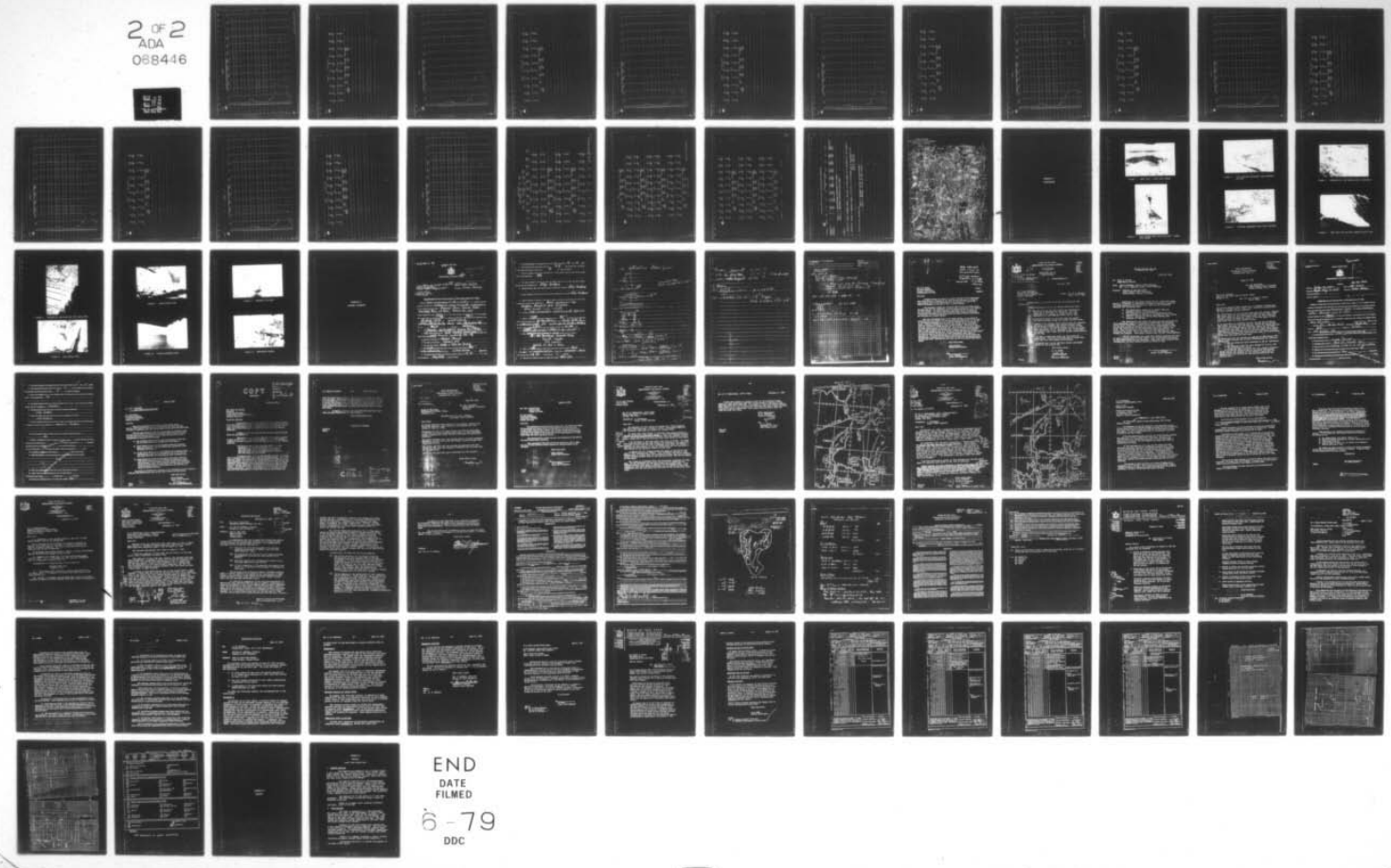
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	1.	1.	1.	2.	3.	5.	9.
15.	19.	20.	16.	11.	7.	4.	3.	2.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	332.	254.	85.	42.	2118.
INCHES		1.31	1.76	1.82	1.82
AC-FT		126.	169.	175.	175.

AD-A068 446 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. LOWER LAKE NIMHAM DAM, INVENTORY N--ETC(U)
SEP 78 E A NOWATZKI, G S SALZMAN DACW51-78-C-0035

UNCLASSIFIED NL

2 OF 2
ADA
088446



END
DATE
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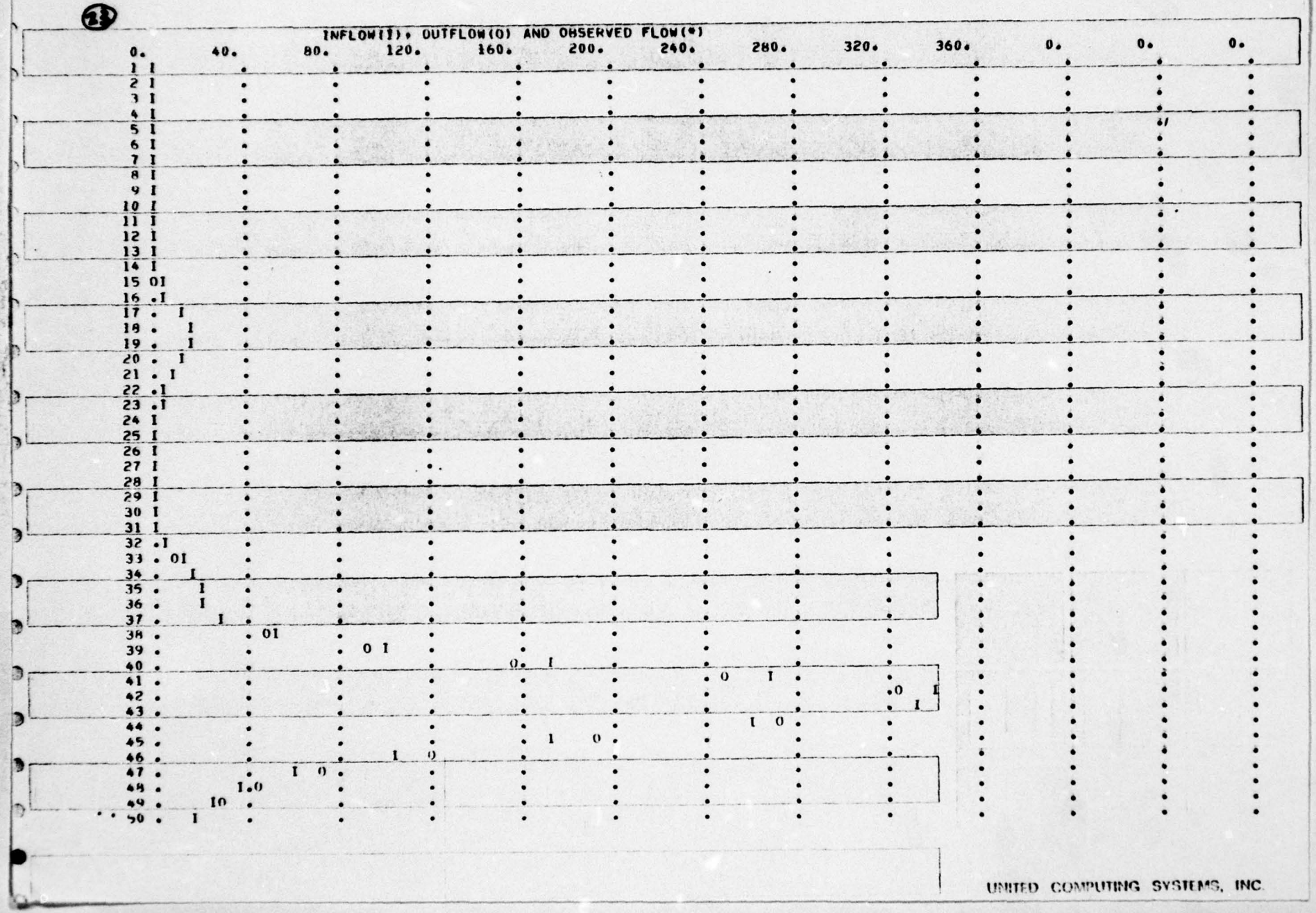
OVF

STATION 1



OVN

STATION 1, PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	4.	9.	20.	30.	31.	24.
16.	9.	5.	3.	2.	1.	1.	0.	0.	0.
2.	8.	18.	29.	37.	42.	54.	98.	183.	316.
338.	338.	391.	442.	404.	338.	338.	338.	284.	74.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	1.	2.	2.	1.
1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	2.	2.	2.	3.	6.	11.	19.
36.	65.	90.	98.	92.	78.	61.	39.	17.	4.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	442.	375.	170.	85.	4227.
INCHES		1.94	3.51	3.64	3.64
AC-FT		186.	337.	350.	350.

OVF

STATION 1

(25)

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0.	100.	200.	300.	400.	500.	600.	700.	0.	0.	0.	0.	0.
1 I												
2 I												
3 I												
4 I												
5 I												
6 I												
7 I												
8 I												
9 I												
10 I												
11 I												
12 I												
13 I												
14 I												
15 I												
16 .I												
17 . I												
18 . I												
19 . I												
20 . I												
21 .IO												
22 .I												
23 IO												
24 I												
25 I												
26 I												
27 I												
28 I												
29 I												
30 I												
31 I												
32 .I												
33 . I												
34 . I												
35 . I												
36 . I												
37 . OI												
38 . OI												
39 . O I												
40 . O I												
41 . O						I						
42 . O							I					
43 . O.							I					
44 . O	I											
45 . I O												
46 . I O												
47 . I O												
48 . I O												
49 . I O												
50 . I O												

OVN

STATION 1, PLAN 1, RTIO 3

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	2.	5.	14.	30.	45.	46.	36.
23.	14.	8.	5.	3.	2.	1.	1.	1.	1.
3.	12.	28.	44.	55.	62.	81.	146.	275.	338.
338.	654.	940.	800.	587.	422.	338.	338.	338.	271.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	2.	3.	3.	2.
1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	2.	3.	3.	4.	5.	9.	16.	34.
72.	116.	133.	125.	111.	95.	79.	60.	38.	16.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	940.	624.	253.	126.	6306.
INCHES		3.22	5.23	5.43	5.43
AC-FT		309.	502.	521.	521.

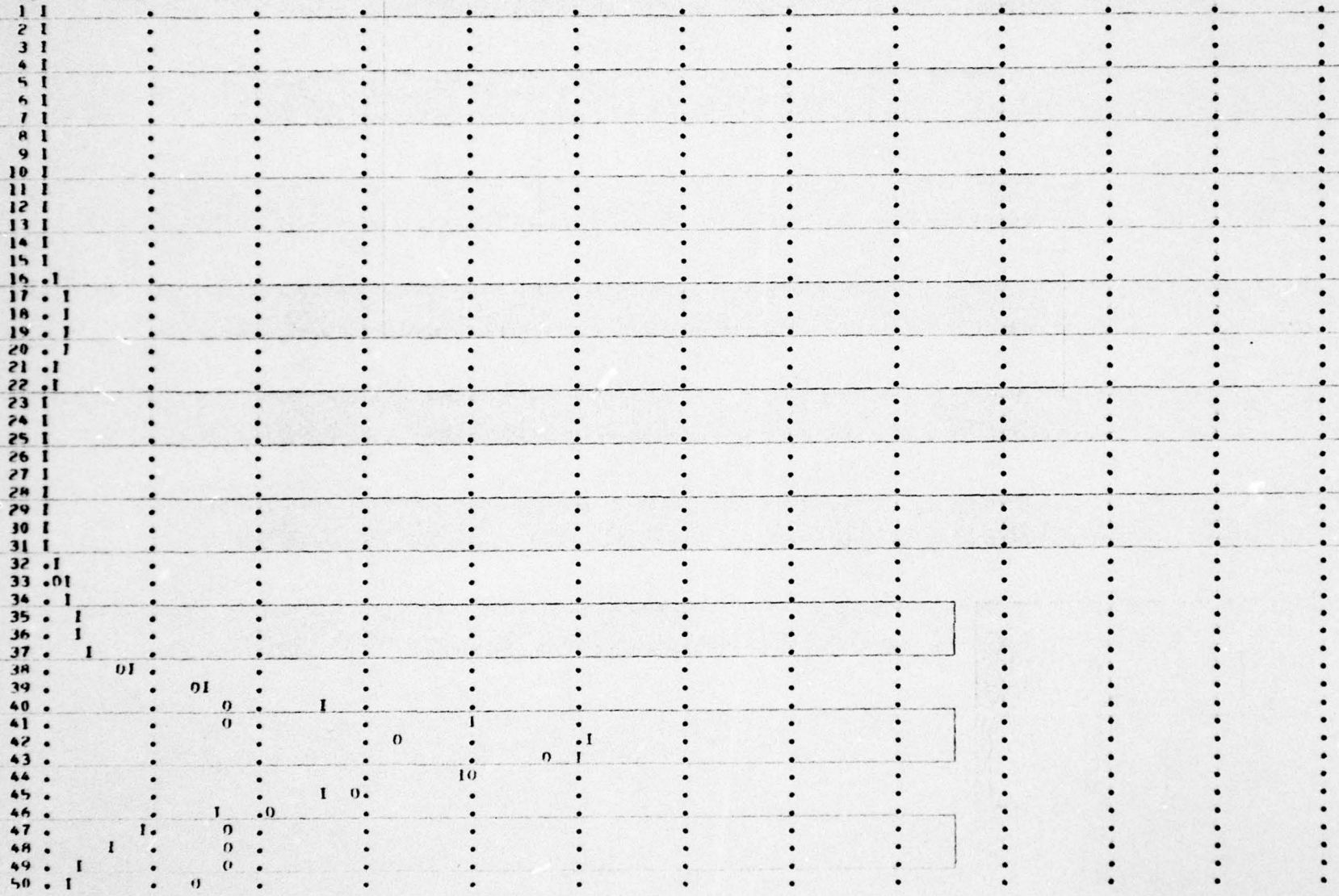
OVF

STATION 1

(27)

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0. 200. 400. 600. 800. 1000. 1200. 0. 0. 0. 0. 0. 0.



•DVH•

STATION 1, PLAN 1, RTIO 4

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	2.	7.	19.	41.	60.	62.	48.
31.	19.	11.	6.	3.	2.	1.	1.	1.	1.
4.	16.	37.	59.	74.	83.	107.	195.	338.	338.
516.	1221.	1333.	1050.	735.	508.	383.	338.	338.	338.

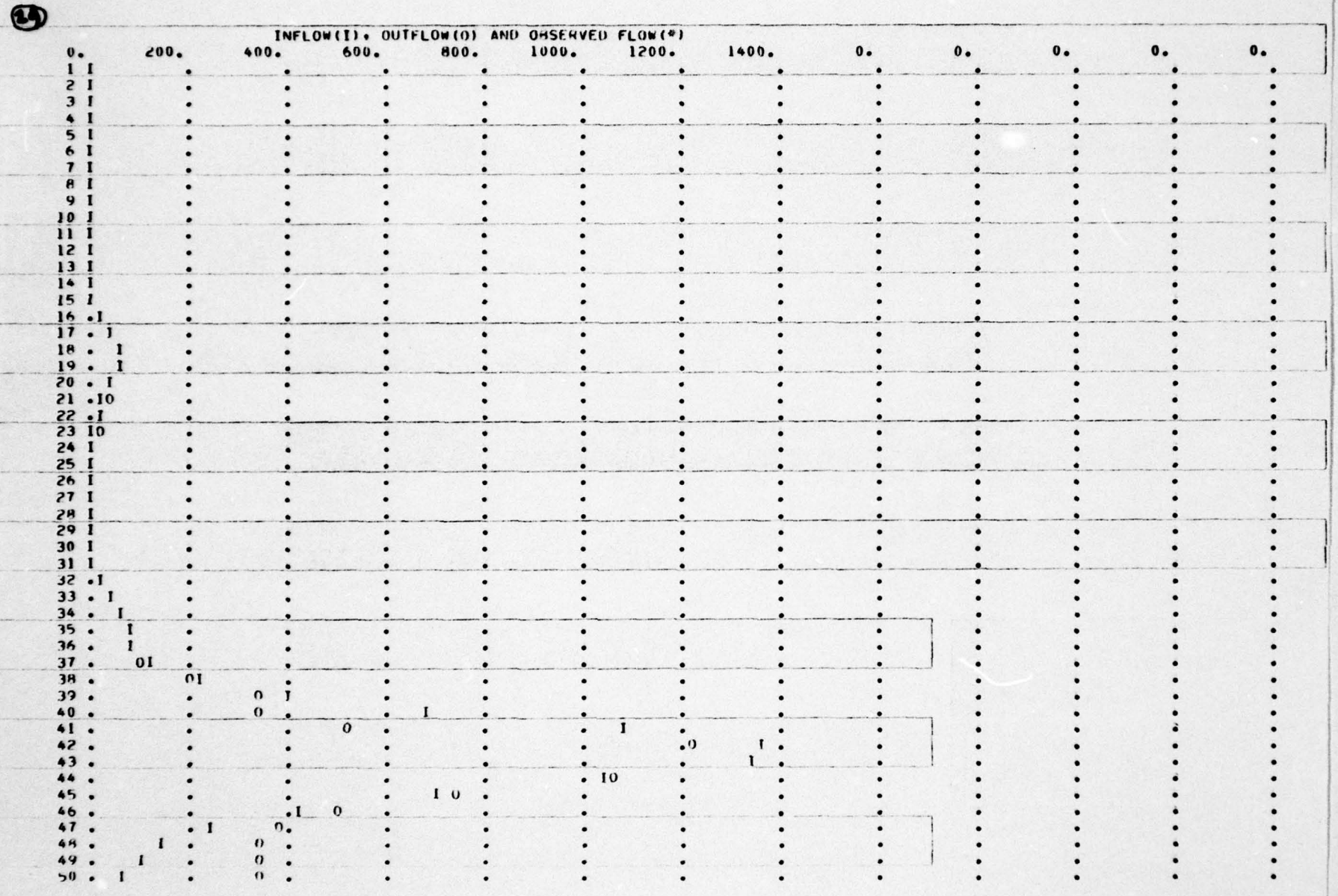
STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	2.	4.	4.	3.
2.	1.	1.	0.	0.	0.	0.	0.	0.	0.
0.	1.	2.	3.	4.	5.	6.	12.	23.	52.
105.	146.	151.	139.	122.	105.	88.	71.	51.	27.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1333.	894.	334.	167.	8326.
INCHES		4.62	6.90	7.17	7.17
AC-FT		444.	663.	688.	688.

OVF

STATION 1



OVN

STATION 1, PLAN 1, RTIO 5

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	3.	9.	24.	51.	75.	77.	60.
39.	23.	13.	8.	4.	3.	2.	1.	1.	1.
5.	19.	46.	73.	92.	104.	134.	244.	338.	338.
949.	1681.	1667.	1301.	894.	597.	422.	338.	338.	338.

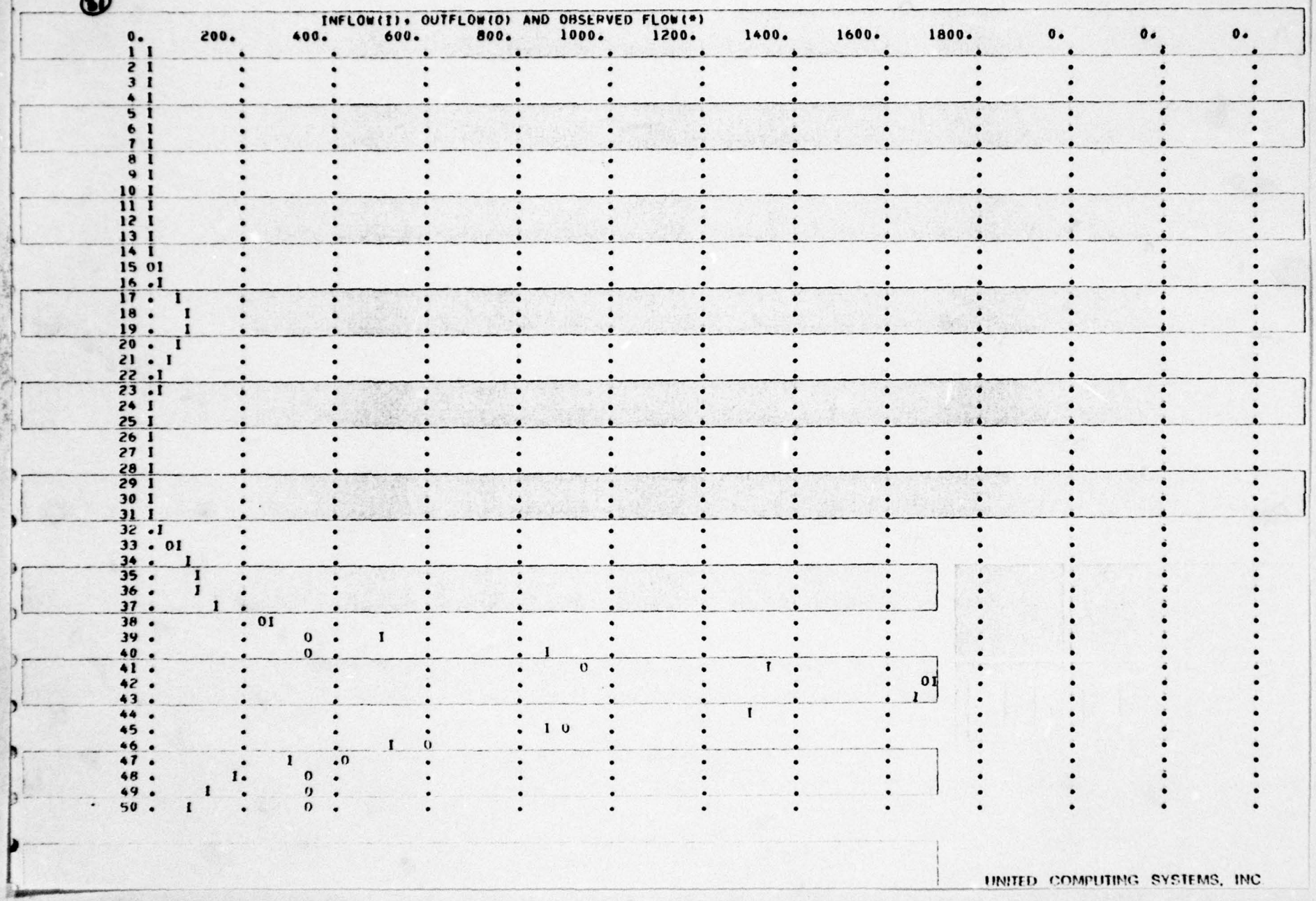
STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	3.	4.	5.	4.
2.	1.	1.	0.	0.	0.	0.	0.	0.	0.
0.	1.	3.	4.	5.	6.	8.	14.	32.	75.
133.	165.	165.	150.	130.	112.	95.	79.	60.	38.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1681.	1182.	414.	206.	10314.
INCHES		6.11	8.55	8.88	8.88
AC-FT		586.	821.	853.	853.

OVF

STATION 1



OVN

STATION 1, PLAN 1, RTIO 6

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	3.	11.	28.	61.	90.	92.	72.
47.	28.	16.	9.	5.	3.	2.	1.	1.	1.
5.	23.	55.	88.	111.	125.	161.	293.	338.	425.
1391.	2046.	2001.	1562.	1046.	686.	462.	367.	338.	338.

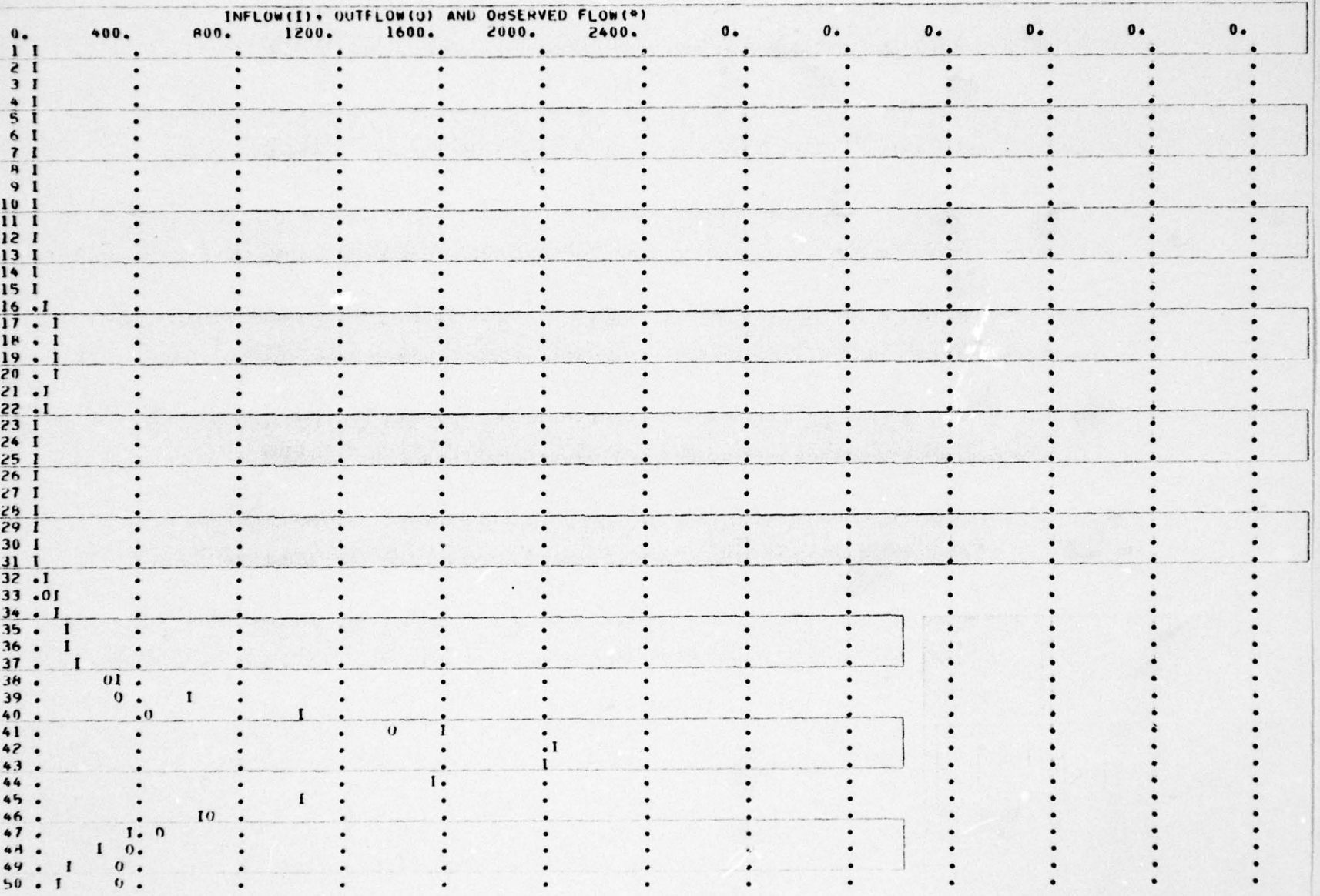
STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	2.	4.	5.	5.	4.
3.	2.	1.	1.	0.	0.	0.	0.	0.	0.
0.	1.	3.	5.	7.	7.	10.	17.	41.	95.
153.	181.	179.	161.	138.	118.	101.	86.	68.	47.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2046.	1455.	494.	247.	12331.
INCHES		7.52	10.22	10.62	10.62
AC-FT		722.	981.	1020.	1020.

OVF

STATION 1



OVN

STATION 1, PLAN 1, RTIO 7

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	4.	13.	33.	71.	105.	108.	83.
55.	33.	19.	11.	6.	4.	2.	2.	1.	1.
6.	27.	64.	102.	129.	146.	188.	338.	338.	600.
1770.	2387.	2334.	1822.	1209.	775.	522.	391.	338.	338.

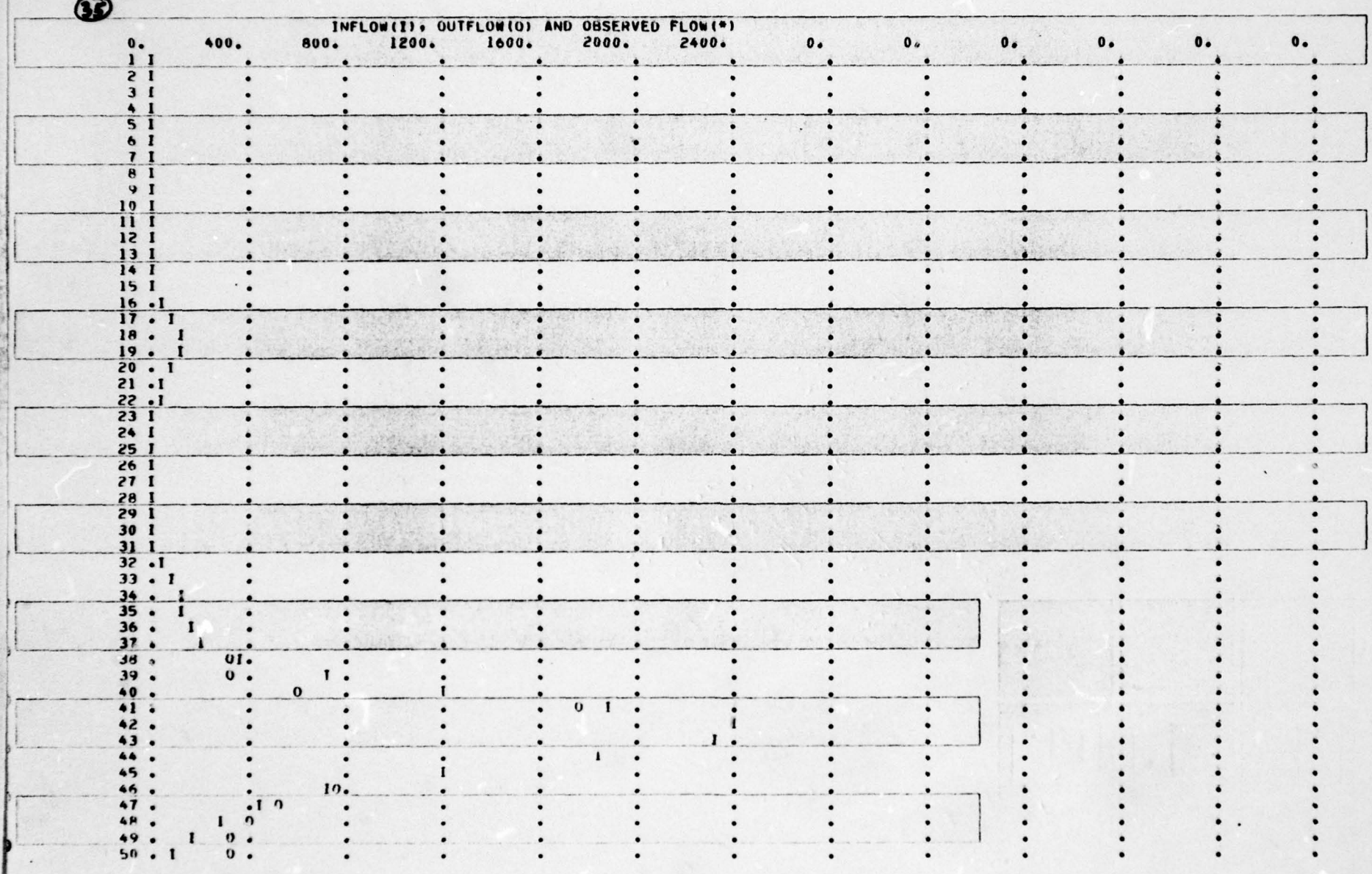
STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	2.	4.	6.	6.	5.
3.	2.	1.	1.	0.	0.	0.	0.	0.	0.
0.	2.	4.	6.	8.	9.	11.	20.	51.	112.
169.	195.	193.	171.	146.	124.	106.	90.	73.	53.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2387.	1716.	576.	288.	14378.
INCHES		8.87	11.91	12.38	12.38
AC-FT		851.	1144.	1189.	1189.

UVF

STATION 1



OVN

STATION 1, PLAN 1, RTIO 8

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	5.	14.	38.	81.	120.	123.	95.
63.	37.	22.	12.	7.	4.	2.	2.	2.	2.
7.	31.	74.	117.	148.	167.	215.	338.	338.	861.
2110.	2728.	2667.	2082.	1381.	867.	575.	415.	338.	338.

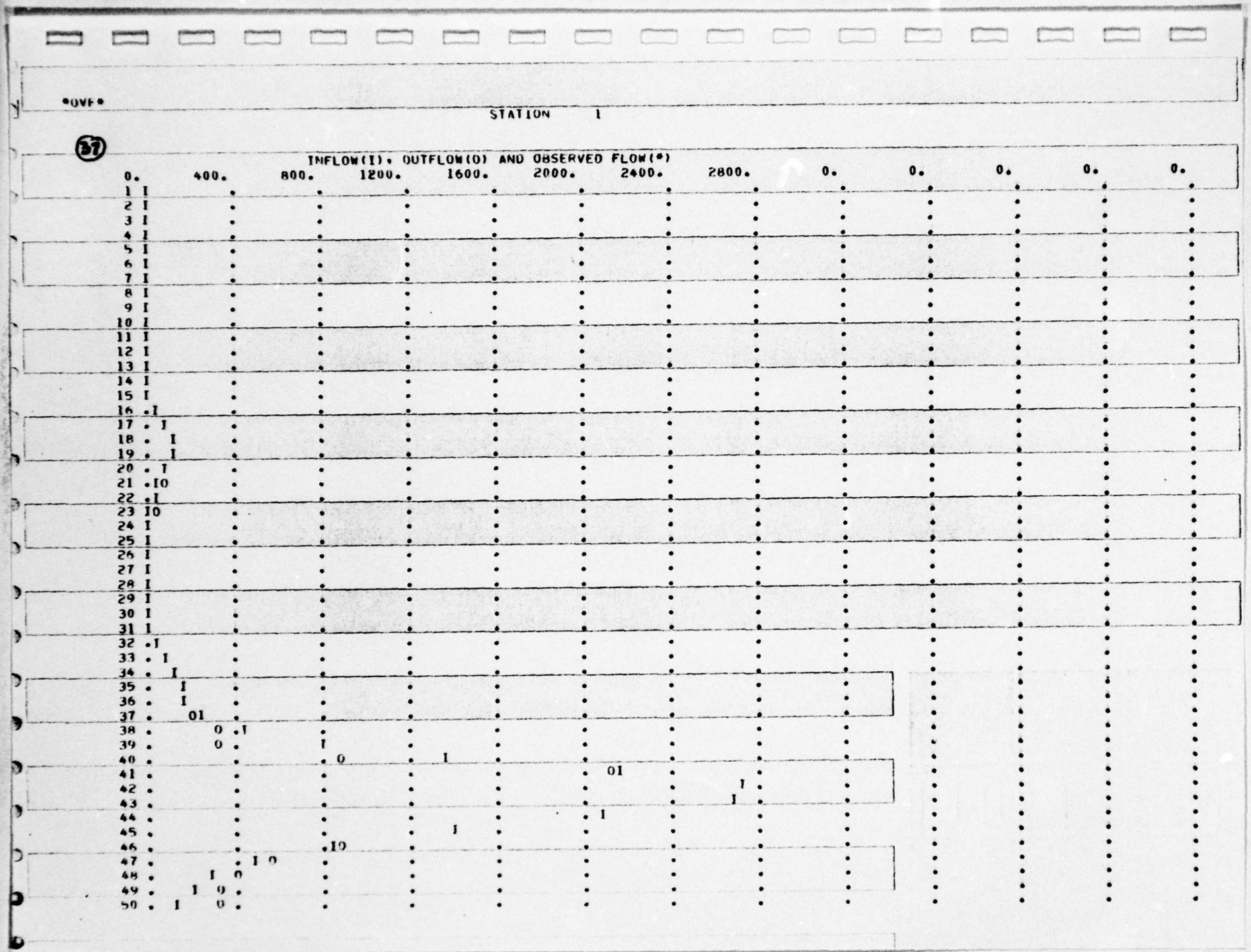
STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	2.	5.	7.	7.	6.
4.	2.	1.	1.	0.	0.	0.	0.	0.	0.
0.	2.	4.	7.	9.	10.	13.	25.	64.	129.
183.	209.	206.	182.	153.	129.	110.	94.	78.	59.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2728.	1973.	659.	329.	16427.
INCHES		10.19	13.61	14.15	14.15
AC-FT		979.	1307.	1358.	1358.

OVF

STATION 1



UVN

STATION 1, PLAN 1, RTIO 9

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	6.	18.	47.	102.	150.	154.	119.
78.	47.	27.	15.	9.	5.	3.	2.	2.	2.
9.	39.	92.	146.	185.	208.	269.	338.	386.	1442.
2683.	3410.	3334.	2603.	1727.	1049.	680.	463.	370.	338.

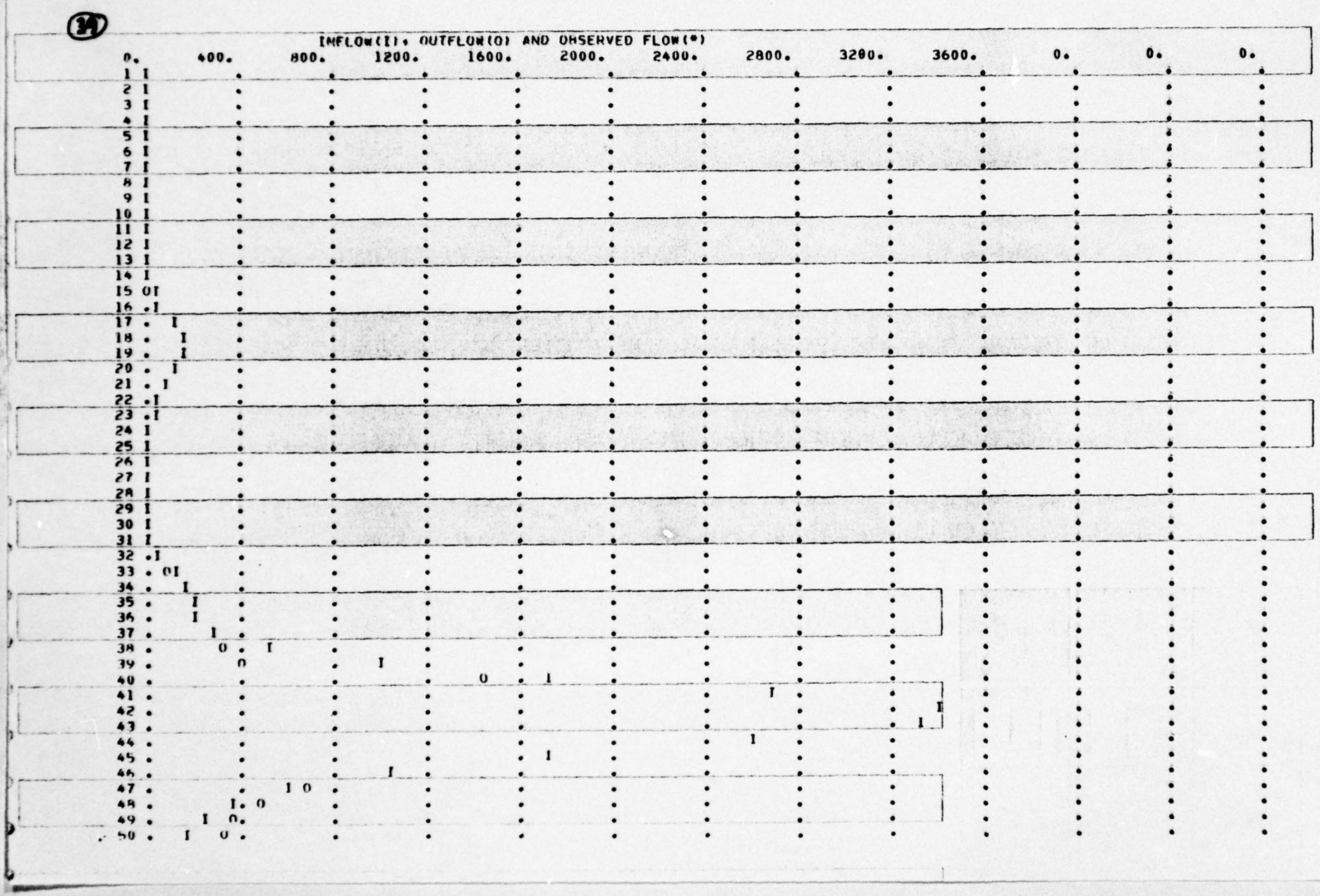
STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	3.	6.	9.	9.	7.
5.	3.	2.	1.	1.	0.	0.	0.	0.	0.
1.	2.	5.	9.	11.	12.	16.	35.	89.	156.
207.	237.	234.	204.	167.	139.	118.	101.	86.	69.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3410.	2533.	824.	411.	20557.
INCHES		13.09	17.04	17.71	17.71
AC-FT		1257.	1635.	1700.	1700.

OVF

STATION 1



ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
-0.0	-0.000	-0.00	1	-0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	-0	-0	-0.000	-0.000	-0.000	-1.

STORAGE=	-0.	20.	40.	60.	81.	101.	121.	142.	163.	-0.
OUTFLOW=	-0.	338.	338.	338.	338.	358.	403.	468.	551.	-0.

STATION 1, PLAN 2, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	2.	5.	10.	15.	15.	12.
8.	5.	3.	2.	1.	1.	0.	0.	0.	0.
1.	4.	9.	15.	18.	21.	27.	49.	92.	158.
249.	324.	332.	273.	191.	120.	72.	43.	27.	17.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	1.	1.	1.	2.	3.	5.	9.
15.	19.	20.	16.	11.	7.	4.	3.	2.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	332.	254.	85.	42.	2118.
INCHES		1.31	1.76	1.82	1.82
AC-FT		126.	169.	175.	175.

STATION 1, PLAN 2, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	4.	9.	20.	30.	31.	24.
16.	9.	5.	3.	2.	1.	1.	0.	0.	0.
2.	8.	18.	29.	37.	42.	54.	98.	183.	316.
338.	338.	348.	366.	363.	348.	338.	338.	338.	152.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	1.	2.	2.	1.
1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	2.	2.	2.	3.	6.	11.	19.
36.	65.	91.	105.	103.	91.	73.	51.	27.	9.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	366.	350.	169.	84.	4210.
INCHES		1.81	3.49	3.63	3.63
AC-FT		174.	335.	348.	348.

STATION 1, PLAN 2, RTIO 3

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	2.	5.	14.	30.	45.	46.	36.
23.	14.	8.	5.	3.	2.	1.	1.	1.	1.
3.	12.	28.	44.	55.	62.	81.	146.	275.	338.
338.	416.	571.	631.	598.	517.	431.	370.	340.	338.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	2.	3.	3.	0.
1.	1.	0.	0.	0.	0.	0.	0.	0.	0.

76. 126. 154. 162. 171. 154. 130. 105. 83. 58.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	631.	527.	233.	117.	5829.
INCHES		2.72	4.82	5.02	5.02
AC-FT		262.	463.	482.	482.

ED

STATION 1, PLAN 2, RTIO 4

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	2.	7.	19.	41.	60.	62.	48.
31.	19.	11.	6.	3.	2.	1.	1.	1.	1.
4.	16.	37.	59.	74.	83.	107.	195.	338.	338.
380.	629.	830.	890.	833.	714.	580.	459.	382.	344.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	2.	4.	4.	3.
2.	1.	1.	0.	0.	0.	0.	0.	0.	0.
0.	1.	2.	3.	4.	5.	6.	12.	23.	52.
111.	182.	232.	247.	233.	203.	170.	139.	112.	87.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	890.	746.	304.	152.	7608.
INCHES		3.86	6.29	6.55	6.55
AC-FT		370.	603.	629.	629.

STATION 1, PLAN 2, RTIO 5

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	3.	9.	24.	51.	75.	77.	60.
39.	23.	13.	8.	4.	3.	2.	1.	1.	1.
5.	19.	46.	73.	92.	104.	134.	244.	338.	338.
506.	848.	1092.	1144.	1064.	909.	737.	580.	451.	374.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	3.	4.	5.	4.
2.	1.	1.	0.	0.	0.	0.	0.	0.	0.
0.	1.	3.	4.	5.	6.	8.	14.	32.	75.
152.	237.	295.	310.	290.	251.	209.	170.	137.	109.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1144.	964.	379.	190.	9483.
INCHES		4.98	7.83	8.17	8.17
AC-FT		478.	752.	784.	784.

STATION 1, PLAN 2, RTIO 6

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	3.	11.	28.	61.	90.	92.	72.
47.	28.	16.	9.	5.	3.	2.	1.	1.	1.
5.	23.	55.	88.	111.	125.	161.	293.	338.	355.
659.	1055.	1325.	1392.	1290.	1100.	891.	700.	540.	421.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	2.	4.	5.	5.	4.
3.	2.	1.	1.	0.	0.	0.	0.	0.	0.
0.	1.	3.	5.	7.	7.	10.	17.	41.	98.
189.	288.	355.	371.	346.	299.	247.	200.	160.	127.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1392.	1176.	456.	228.	11401.
INCHES		6.08	9.42	9.82	9.82
AC-FT		583.	904.	943.	943.

STATION 1, PLAN 2, RTIO 7

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	4.	13.	33.	71.	105.	108.	83.
55.	33.	19.	11.	6.	4.	2.	2.	1.	1.
0.	27.	64.	102.	129.	146.	148.	338.	338.	400.
805.	1257.	1564.	1637.	1515.	1290.	1044.	821.	633.	480.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	2.	4.	6.	6.	5.
3.	2.	1.	1.	0.	0.	0.	0.	0.	0.
0.	2.	4.	6.	8.	9.	11.	20.	51.	120.
226.	338.	414.	432.	402.	346.	285.	230.	183.	145.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1637.	1385.	533.	267.	13336.
INCHES		7.16	11.02	11.49	11.49
AC-FT		687.	1058.	1103.	1103.

STATION 1, PLAN 2, RTIO 8

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	5.	14.	38.	81.	120.	123.	95.
63.	37.	22.	12.	7.	4.	2.	2.	2.	2.
7.	31.	74.	117.	148.	167.	215.	338.	338.	477.
954.	1461.	1805.	1884.	1740.	1481.	1198.	941.	725.	551.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	2.	5.	7.	7.	6.
4.	2.	1.	1.	0.	0.	0.	0.	0.	0.
0.	2.	4.	7.	9.	10.	13.	25.	64.	144.
263.	389.	474.	494.	458.	393.	323.	260.	206.	163.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1884.	1595.	611.	306.	15282.
INCHES		8.24	12.63	13.16	13.16
AC-FT		791.	1212.	1264.	1264.

STATION 1, PLAN 2, RTIO 9

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	6.	18.	47.	102.	150.	154.	119.
78.	47.	27.	15.	9.	5.	3.	2.	2.	2.
9.	39.	92.	146.	185.	208.	269.	338.	347.	665.
1241.	1861.	2281.	2373.	2188.	1860.	1504.	1181.	910.	691.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	3.	6.	9.	9.	7.
5.	3.	2.	1.	1.	0.	0.	0.	0.	0.
1.	2.	5.	9.	11.	12.	16.	35.	90.	191.
334.	488.	592.	615.	569.	488.	399.	319.	252.	197.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2373.	2011.	767.	384.	19175.
INCHES		10.39	15.85	16.52	16.52
AC-FT		998.	1521.	1586.	1586.

********** ********** ********** ********** **********

PEAK FLOW SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

(3)

OPERATION	STATION	PLAN	RATIOS APPLIED TO FLOWS .10	.20	.30	.40	.50	.60	.70	.80	1.00
HYDROGRAPH AT (INFLOW)	1	1	361.	721.	1082.	1442.	1803.	2164.	2524.	2885.	3606. 3 PMF
		2	361.	721.	1082.	1442.	1803.	2164.	2524.	2885.	3606.
ROUTED TO (OUTFLOW)	1	1	332.	442.	940.	1333.	1681.	2046.	2387.	2728.	3410.
		2	332.	366.	631.	890.	1144.	1392.	1637.	1884.	2373.

PLAN 1 = MAINTAINED CONDITIONS (n = .025)
PLAN 2 = EXISTING CONDITIONS (n = .150)

NOTES:

1. BASED ON STAGE-STORAGE TABLE, THE DAM IS OVERTOPPED AT A STORAGE OF 163 ACRE-FT

2. BASED ON STAGE-DISCHARGE TABLE, THE DAM IS OVERTOPPED AT A DISCHARGE OF:
   PLAN 1 1615 CFS
   PLAN 2 550 CFS

3 OVERTOPPING OCCURS AT:
   PLAN 1 - BETWEEN .40 AND .50 PMF (≈0.48)
   PLAN 2 - BETWEEN .20 AND .30 PMF (≈0.27)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPENDIX D

PHOTOGRAPHS

FIGURE 1 DROP INLET - UPPER LAKE NIMHAM

FIGURE 2 TWIN CHIMNEY DROP INLET SPILLWAY - LOWER LAKE NIMHAM

FIGURE 3 LEFT UPSTREAM EMBANKMENT NEAR EMERGENCY SPILLWAY

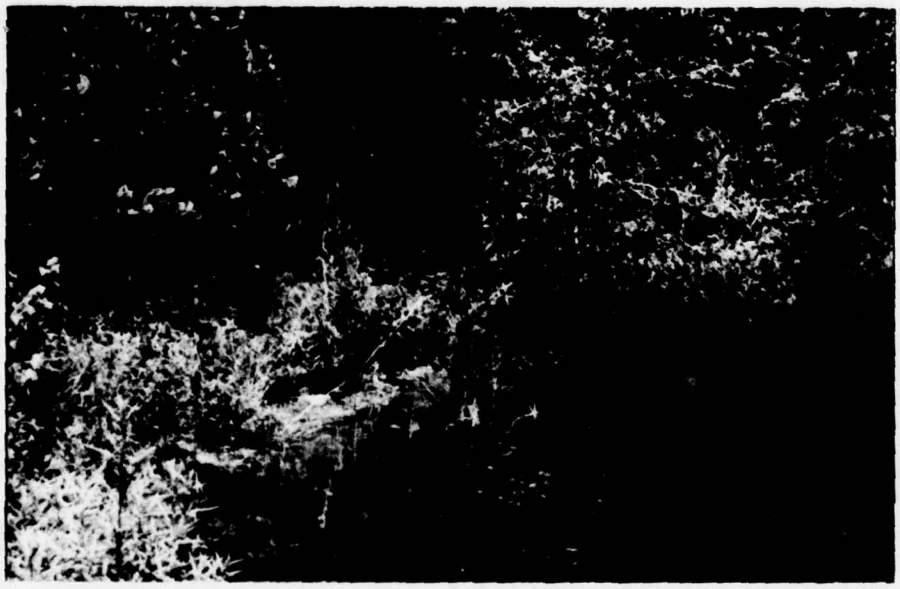


FIGURE 4 UPSTREAM EMBANKMENT NEAR RIGHT ABUTMENT

FIGURE 5 SUBMERGED RIP RAP AROUND OUTLET STRUCTURE

FIGURE 6 DROP INLET AND 48-INCH DIAMETER OUTLET PIPE

FIGURE 7 TURNING NUT AND RISER ROD FOR SLUICE GATE

FIGURE 8 LEFT OUTLET PIPE

FIGURE 9 RIGHT OUTLET PIPE

FIGURE 10 TYPICAL RESERVOIR AREA

FIGURE 11 EMERGENCY SPILLWAY

FIGURE 12 DOWNSTREAM CHANNEL

APPENDIX E

RELATED DOCUMENTS

Form E-61, 7-10-53 M (D-111) Ord. 7-08-73

STATE OF NEW YORK

DEPARTMENT OF PUBLIC WORKS

ALBANY

MAY 6 1954

Received May 6, 1954 Dam No. 231-2050

Disposition Approved May 6, 1954 Watershed Lower Hudson

Foundation inspected

Structure inspected

Application for the Construction or Reconstruction of a Dam

Application is hereby made to the Superintendent of Public Works, Albany, N. Y., in compliance with the provisions of Section 948 of the Conservation Law (see third page of this application), for the approval of specifications and detailed drawings, marked Proposed Dam - Lower Lake Nimham, Town of Kent, Putnam Co., N.Y

herewith submitted for the { construction / reconstruction } of a dam herein described. All provisions of law will be complied with in the erection of the proposed dam. It is intended to complete the work covered by the application about June 1954 (Date)

1. The dam will be on Bailey Brook flowing into Boyds Corner Res. in the town of Kent County of Putnam and 1 1/4 miles northwest of Gypsy Trail Camp (Give exact distance and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)

2. Location of dam is shown on the Lake Carmel, edition 1949 quadrangle of the United States Geological Survey.

3. The name of the owner is Joseph Freund

4. The address of the owner is Carmel, N.Y

5. The dam will be used for create a lake for fishing

6. Will any part of the dam be built upon or its pond flood any State lands? No

7. The watershed above the proposed dam is 1,000 Acres square miles.

8. The proposed dam will create a pond area at the spillcrest elevation of 15.5 acres and will impound 900,000 cubic feet of water.

9. The maximum height of the proposed dam above the bed of the stream is 12 feet 6 inches.

10. The lowest part of the natural shore of the pond is 3.5 feet vertically above the spillcrest, and everywhere else the shore will be at least 5 feet above the spillcrest.

11. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam No

12. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) Clay hardpan

13. Facing downstream, what is the nature of material composing the right bank? Clay hardpan

14. Facing downstream, what is the nature of the material composing the left bank? Clay hardpan

15. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. hard, impervious clay hardpan. Excellent dam foundation

16. Are there any ~~perods~~ seams or fissures beneath the foundation of the proposed dam? No

17. WASTES. The outlet spillways of the above proposed dam will be 90 feet long in the clear; the waters will be held at the right end by a Earthen fill dam the top of which will be 2.5 feet above the spillcrest, and have a top width of 20 feet, and at the left end by a Earthen Fill Dam the top of which will be 2.5 feet above the spillcrest, and have a top width of 20 feet.

18. The outlet spillway is designed to carry ~~the~~ a flood discharge of 1350 cubic feet per second.

19. Pipes, sluice gates, or flood gates will be provided through the dam as follows:

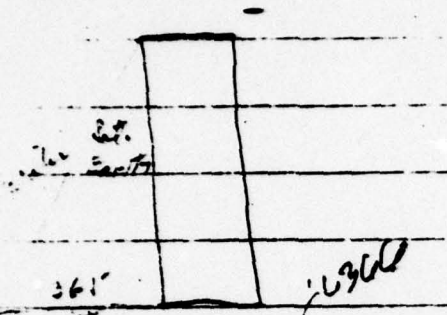
2-48 Reinforced Concrete Pipes

20. What is the maximum height of flash boards which will be used on this dam? None

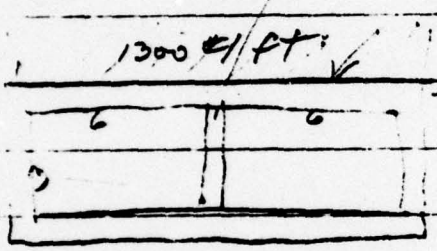
21. APRON. Below the proposed dam there will be an apron built of Concrete - four feet long across the stream 21 feet wide and 1 feet thick.

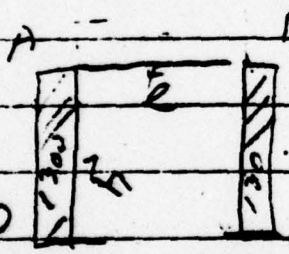
22. Does this dam constitute any part of a public water supply? No

ict Structure Design



mom @ fixed end
$\frac{1}{12} wl^2 = \frac{1}{12} \times 1300 \times 9 = 9750$ ft-lb



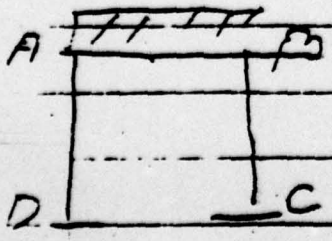


$K = \frac{\frac{1}{12} \times 1 \times 1}{12} = \frac{1}{144} = \frac{1}{4}$

$r = \frac{\frac{1}{12} \times 7}{\frac{1}{12}} = \frac{7}{4}$

$M_{AB} = M_{BC} = -\frac{9100 \times 7}{12} \times \frac{1.75}{1.75 + 2} = -2480$ ft-lb

$M_{CB} = -M_{DA} = 5310 \left[\frac{1.75 + 3}{1.75 + 2}\right] = +6830$ ft-lb



$M_{AB} = M_{BC} = -\frac{5200 \times 4}{6(1.75 + 2)} = -927$ ft-lb

$M_{CB} = -M_{DA} = -\frac{5200 \times 4}{12(1.75 + 2)} = 464$ ft-lb

$M_{AB} = M_{BC} = -2480 - 927 = -3407$ ft-lb

$M_{CB} = -M_{DA} = +6830 - 464 = -6366$ ft-lb

Corner. Moment 3000 #

Mom. & Each Span 4500 # Use for all

Mom. center support 6300 #

℄ Beam

$K = \frac{4500}{10} = 450$ $\rho = .00274$

$A_s = .00274 \times 12 \times 10 = .33$ sq. in. Reqd.

Used ½" d bars $A_s = .29$

Form R. & C. C-7-A-1. 6-10-49-2M (2B-696)
O HC C-65-50

Subject

Sheet No.
Total No. Sheets
Date

Run-off

$Q = CIA$

$A = 1000$ Acres

$C = .15$ assumed (Very Swampy)

$I =$ See below $= 2.2$

$L =$ 5000' on 3.70 Gr. Swampy Putnam County

Assume $V = 1.5$ per sec.

$\frac{5000}{1.5} = 5300$ sec. $= 90$ min. $= t$

$I = 2.2$ = ...

$Q = .15 \times 2.2 \times 1000 = 330$ cfs. OK

SPILLWAY $Q = Ca\sqrt{2gH}$

425.0
415.0
$H = 10.0$

2- 48" R.C. Pipes 5'-2" lg. $C = .70$

$a = 25.4$

$Q = .70 \times 25.4 \times 8 \times 3.16 = 445$ cfs OK

Computed by J.K. Date 5/6/52

Checked by Date

Data referring to first 2 dams at Site of present dam

Last page contains computation of runoff & spillway adequacy

June 14, 1955

CMJ
6/29/78

Mr. J. S. Bixby
District Engineer
Pleasant Valley Road
Poughkeepsie, New York

Dear Sir:

Attached hereto is a copy of a letter received by this department from Judge Samuel I. Rosenman of New York City in reference to damage to some property owned by his wife caused by the failure of a dam on the Nimham development in the Town of Kent in Putnam County.

The Governor's office has requested that we look into this matter and give them all the information we could obtain pertaining to the reasons for this failure. We would, therefore, appreciate it if you would, as soon as possible, have one of your Engineers make a field investigation to determine the cause of the failure and any other pertinent information and then give us a report thereon.

From the information given in the Judges letter, we are unable to determine which dam failed. We have approved the construction of two dams on the Nimham development but are uncertain whether or not it was one of these. Enclosed herewith is a U.S.G.S. map of Lake Carmel quadrangle with the locations of these two dams spotted thereon. Should it be one of these, please let us know which one. If it is not one of these, please spot the exact location on the map and return it to this office together with a rough free-hand plan of the pond, location and size of spillway, and section through dam and etc. We should also have the name of the owner; the date the dam was built and any other information which might be appropriate. The owner should also be informed that he should submit for our approval an application and three sets of plans for the repairs before starting any work. Enclosed you will find two of our standard application forms.

Very truly yours,

Henry TenHagen
Deputy Chief Engineer

Encl.

By: _____
H. C. Ogsbury
Assoc. Civil Engineer

HCO:
Attach.

STATE OF NEW YORK

DEPARTMENT OF PUBLIC WORKS

JOHN W JOHNSON
SUPERINTENDENT

JAMES S. BIXBY, DIST. ENG.
PLEASANT VALLEY ROAD
P. O. BOX 591 POUGHKEEPSIE, N.Y.

COUNTIES IN 9TH DISTRICT
COLUMBIA
DUTCHESS
ORANGE
PUTNAM
ROCKLAND
ULSTER
WESTCHESTER

Failure of Dam at Ninham
Development
Town of Kent, Putnam County
Reference No. 231-2050

POUGHKEEPSIE, N.Y.

June 24, 1955

Mr. Henry TenHagen
Deputy Chief Engineer
Department of Public Works
Albany, New York

Atten: Mr. D. C. Ogsbury
Assoc. Civil Engr.

Dear Sir:

Please refer to your letter of June 14 concerning the subject dam.

A field examination by our Mr. Farmer disclosed that:-

(1) The dam which failed was located as indicated on your map by Reference No. 231-2050. This was verified by the owner Mr. Joseph Freund, who displayed his approved plan dated May 6, 1954.

(2) An estimated 3004 c.y. of earth fill was washed out down the steep, rough and wooded mountain slope.

(3) A letter to Mr. Freund dated June 16 from Mr. Rosenman indicates an agreement was reached between these two to permit a sufficient amount of water to flow down the stream thruout the summer and winter months. This, apparently is Mr. Rosenman's only concern at the present time, other than the proper reconstruction of the dam.

(4) It is felt an effective water cut off should be constructed. The former dam had only an earth fill which may have been poorly consolidated.

We are enclosing your map of the Lake Carmel quadrangle indicating the location of the subject dam.

Very truly yours,

J. S. BIXBY

J S Bixby Jr

District Engineer

DF:jl

N. Y. S. D. P. W.
Inter-Office Memo

June 28, 1955

To: Saul C. Corwin
Department Counsel

From: Henry TenHagen, Deputy Chief Engineer
By: D. C. Ogsbury, Assoc. Civil Engineer

Subject: Failure of Dam #231-2050
Lower Hudson River Watershed
Town of Kent, County of Putnam

Referring to the letter dated June 6, 1955 from Judge Samuel I. Rosenman in reference to damage to property owned by his wife caused by the failure of a dam, we are enclosing herewith the following data:

1. Two photostatic copies of a report from our District Office at Poughkeepsie.
2. Two photostatic copies of the application for construction of the dam as approved by this office.
3. Two U.S. Geological Survey maps showing the location of the dam.

The application and plans for this dam were approved by this department under our designation #231-2050 of the Lower Hudson River Watershed. These plans show a well designed dam, but we have no way of knowing how well the construction in the field was carried out as the department does not inspect the work. This is left up to the owner and the Engineer who prepared the plans. We do not know at this time exactly what caused the failure. This would require some further investigation.

We are informing the owner that before starting any work on the reconstruction he must submit a new application and plans to this department for our approval. When the owner submits such information, we will forward copies of these to you.

D. C. Ogsbury
Assoc. Civil Engineer

JK:fs
Encl.

CARMEL 5-3312

SUBDIVISION PLANNING
SANITATION
DAM DESIGN
CONSTRUCTION
SPECIFICATIONS

ROY BURGESS
Land Surveyor & Professional Engineer
PROFESSIONAL BLDG., CARMEL, N. Y.

July 11, 1955

Re: Dam #231-2050
Lower Hudson River Watershed
Joseph Freund, etal, owners.

Mr. B. D. Tallamy,
State of New York, Dept of Public Works,
Albany 1, NY

Att. of: Mr. George W. Turnes
Senior Engr.

Dear Sir:

We enclose herewith three prints of our drawing covering the above as revised, July 9, 1955. Also, enclosed is application for your approval of the revision.

The construction of this dam was completed last summer. However, the sluice gate was not closed until March of this year. When the water level was about 18 inches below the weir elevation a break occured at about the center of the dam three or four feet above the 2-48 inch overflow pipes.

It is impossible to determine exactly why the dam failed at this point. The fact that the dam was exposed to the weather all winter certainly has some bearing. Frost will enter new fill to a considerable depth and we feel the action of the frost weakened the structure. If the dam had been under water during the winter months we doubt if the failure would have occured. There is some evidence that the materials used for construction of the dam contained too much clay.

We definitely feel the failure was <u>not</u> due to the design. However, we have revised the drawing to strengthen the structure as follows:

1. The top width has been increased to 25 ft. instead of 20 ft.
2. The up-stram slope has been changed to 1 on 4, and the downstream to 1 on 3.
3. A pipe has been installed from the outfall structure to the toe of the upstream face to eliminate the channel which reduced the section at this point. A new source of material has been located for the reconstruction of the earthen fill.

Very truly yours,

231-2050

Form E-21, 6-14-55-2M (10-54)
Cat. 7-48-55

STATE OF NEW YORK

DEPARTMENT OF PUBLIC WORKS

ALBANY

JUL 1

See 231-2050

Received July 12, 1955

Disposition Appr. Aug. 4, 1955

Foundation inspected

Structure inspected

Dam No. 231-2327

Watershed Lower Hudson

Superseded by Dam 231-3511

Application for the Construction or Reconstruction of a Dam

Application is hereby made to the Superintendent of Public Works, Albany, N. Y., in compliance with the provisions of Section 948 of the Conservation Law (see third page of this application) for the approval of specifications and detailed drawings, marked Proposed Dam - Lower Nimham Lake - Revised July 9 - 1955

herewith submitted for the { construction / reconstruction } of a dam herein described. All provisions of law will be complied with in the erection of the proposed dam. It is intended to complete the work covered by the application about Aug 30 - 1955 (Date)

1. The dam will be on Bailey Brook flowing into Boyd Corners Reservoir in the town of Kent County of Putnam and See location map

(Give exact distance and direction from a well-known bridge, dam, village, main cross-roads or mouth of a stream)

2. Location of dam is shown on the Lake Carmel-Edition 1948 quadrangle of the United States Geological Survey.

3. The name of the owner is Joseph Freund

4. The address of the owner is Main St, Carmel, N.Y.

5. The dam will be used for creating a lake to be used for recreation

6. Will any part of the dam be built upon or its pond flood any State lands? No

7. The watershed above the proposed dam is See previous application from 231-2050 square miles.

8. The proposed dam will create a pond area at the spillcrest elevation of [illegible] acres and will impound [illegible] cubic feet of water.

9. The maximum height of the proposed dam above the bed of the stream is 15 feet 0 inches.

10. The lowest part of the natural shore of the pond is 4 feet vertically above the spillcrest, and everywhere else the shore will be at least 4 feet above the spillcrest.

11. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam NO

12. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) hardpan

13. Facing downstream, what is the nature of material composing the right bank? clay hardpan

14. Facing downstream, what is the nature of the material composing the left bank? clay hardpan

15. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. impervious hardpan

16. Are there any porous seams or fissures beneath the foundation of the proposed dam? NO

17. WASTES. The spillway of the above proposed dam will be from feet long in the clear; the waters will be held at the right end by a previous application the top of which will be feet above the spillcrest, and have a top width of feet; and at the left end by a see previous application the top of which will be feet above the spillcrest, and have a top width of feet.

18. The spillway is designed to safely discharge cubic feet per second.

19. Pipes, sluice gates, etc., for flood discharge will be provided through the dam as follows:

20. What is the maximum height of flash boards which will be used on this dam? See previous application

21. APRON. Below the proposed dam there will be an apron built of feet long across the stream, feet wide and feet thick.

22. Does this dam constitute any part of a public water supply? No.

July 14, 1955

Re: Dam - #231-2050
Lower Hudson River Watershed

Mr. Roy Burgess
Consulting Engineer
Professional Building
Carmel, New York

Dear Sir:

This is to acknowledge the receipt of your letter dated July 11, 1955 together with a revised application and three (3) sets of plans in connection with the reconstruction of the above identified dam.

From the data which you sent us, we are unable to determine just how much of the dam is to be rebuilt or whether the entire dam is to be reconstructed as a new structure. At any rate, we would like to have incorporated in the plans the following:

1. The concrete pipes should be laid on undisturbed earth and not on a fill as shown on Section A-A of the plans.

2. There should be concrete anti-seep-collars around the concrete pipes as indicated in red on Section A-A, constructed after the pipes are in place.

3. If the inlet structure is to be rebuilt the horizontal steel reinforcement should be as indicated in red on the plan of the inlet using the same size bars as shown on Section B-B.

4. There should be a note on the plans to the effect that the fill around the pipes should be placed in horizontal layers not to exceed 4" in thickness and that extreme care should be taken to secure tight contact between the fill and the surface of the conduits, collars, inlet structure, and headwall, by means of adequate tamping.

One print is herewith being returned to you embodying the above changes. When you have revised your plan, please send us three (3) new prints.

Very truly yours,

Henry Tenhagen
Deputy Chief Engineer

HT/em
Encl.

Mr. L. C. Roberts

The person mailing or delivering this letter must fill out the following:

DATE 7/20 19

MAILED BY

DELIVERED BY

AT A.M. P.M.

There must be no exception to this rule.

COPY

RGC&K

July 20, 1938

Mr. Saul C. Cornin
Counsel
State of New York
Department of Public Works
Albany, New York

Dear Mr. Cornin:

I appreciate very much the courtesy and cooperation you have shown to me through Mr. Milton D. Bernard in connection with the information which I have sought relative to a dam, the recent breakage of which has caused damage to my property.

I have a much clearer picture of what happened and what is contemplated.

What disturbs me is the statement contained in the letter to you from [illegible] D. C. Cadbury, the Associate Civil Engineer of your Department, dated June 23, 1938. The statement is:

> "We have no way of knowing how well the construction in the field was carried out, as the Department does not inspect the work. This is left up to the owner and the engineer who prepared the plans."

I suppose that this is the result of lack of funds, but I am sure you will agree that it is surprising. The purpose of filing the plans with the Department of Public Works and obtaining its approval is obviously to protect people and property from damage; yet, apparently, the plans can be filed and the actual construction can bear no relationship to the plans. Do you not think that this is something which ought to be corrected? In this particular case, for example, it has not been determined whether the dam has been built or

will be built in accordance with the plans which were filed and approved. Of course, I am not interested so much in the past history as I am to make sure that when your department approves the plans, the construction is strictly in accordance with such plans. I am sending you several copies of this letter in the event that you want to send them to anyone else.

I repeat, I am deeply grateful for your help and that of your Department in this matter.

Very sincerely yours,

Samuel I. Rosenman

SIR:FFP
Encs.

CARMEL 9-3312

SUBDIVISION PLANNING
SANITATION
DAM DESIGN
CONSTRUCTION SPECIFICATIONS

ROY BURGESS
Land Surveyor & Professional Engineer
PROFESSIONAL BLDG., CARMEL, N. Y.

AUG 3 1955

EMAIL

TO:

July 28, 1955

Re: Dam #231-2050
Lower Hudson Watershed
Revision

State of New York,
Department of Public Works,
Albany 1, N.Y.

Attention of Mr. D. P. Ogsbury,
Associate Civil Engineer

Dear Sirs:

We submit herewith three prints of the drawing covering the above dam which has been revised in accordance with your letter of July 14, 1955.

Referring to item #1 of your letter, it will be impossible to lay the new pipe on undisturbed earth. We have therefore shown a concrete mat under the pipe extending to undisturbed material.

The inlet structure was not damaged and is in good condition. Therefore, we have not shown the change requested under item #3 of your letter.

All of the old fill will be removed and replaced with new materials. The pipe and concrete structures now in place will not be disturbed.

Thank you for your help and cooperation on this project.

Very truly yours,

Roy Burgess

August 5, 1955

Re: Dam - Bailey Brook
Town of Kent
County of Putnam

Mr. Roy Burgess
Consulting Engineer
Professional Building
Carmel, New York

Dear Sir:

The application and plans filed by you with this department under the provisions of Section 948 of the Conservation Law for the owner Joseph Freund, Main Street, Carmel, N.Y. for the reconstruction of an existing dam on Bailey Brook in the Town of Kent, County of Putnam, are approved to the extent of the authority of the Superintendent of Public Works under the above mentioned statute.

The reconstruction of this dam has our designation # 231-2327 of the Lower Hudson River Watershed.

This supersedes # 231-2050 previously approved on May 6, 1954. One set of plans formally stamped approved is being returned to you herewith.

Very truly yours,

Henry TenHagen
Deputy Chief Engineer

By _____
D. C. Ogsbury
Assoc. Civil Engineer

JH:fw
Encl.

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS

J. BURCH McMORRAN
SUPERINTENDENT

M. N. SINACORI, DIST. ENG.
2D DUTCHESS TURNPIKE
P. O. BOX 591, POUGHKEEPSIE, N. Y. 12602

COUNTIES IN 9TH DISTRICT
COLUMBIA
DUTCHESS
ORANGE
PUTNAM
ROCKLAND
ULSTER
WESTCHESTER

RECEIVED
ASST. SUPT.
CIVIL AND [illegible]
CHIEFS
FEB 4 - 1965
[illegible] to:
[illegible]nction
[illegible]
[illegible]
[illegible]ting Plant
[illegible]

POUGHKEEPSIE, N.Y.

February 3, 1965

Dam at Lake Ninham
Town of Kent
Putnam County

Mr. E. C. Hudowalski, Ass't Supt.
State Department of Public Works
Albany, New York

Attention: A. Dickinson
Assoc. Civil Engineer

Dear Sir:

In reference to your letter of January 20, 1965 regarding the above mentioned dam, I talked with Mr. Christopher Deane on the telephone regarding this matter on January 28th.

This is not the one we are to inspect. 2/4/65

It seems that Lake Ninham is actually twin lakes divided by the dam in question over which passes a town road (Smalley Corners Road). With the intersection of Maynard Road and Smalley Corners Road, Ninham Drive (not an official town road) heads to the south.

I am attaching a town map where this area is shown. It seems that when the area around Lake Ninham was developed, the owner was required to file with the town a document which puts the responsibility for any repairs to the dam separating the two portions of Lake Ninham on the property owners in that area.

I talked with Mr. Joseph Freund the owner of the dam at the time of its construction (1952±). The southwest section of Lake Ninham which is higher than the northwest section has never flooded across Smalley Corners Road in the dam area since 1952 in the memory of the owner.

Mr. Deane is concerned about the structural soundness of this dam. He was disturbed by the fact there was no guide rail on Smalley Corners Road where it passes over the subject dam. I informed him that this matter would have to be handled by the town residents with the town board as this area is now an official town road.

Mr. E. C. Hudowalski, Ass't. Supt. February 3, 1965

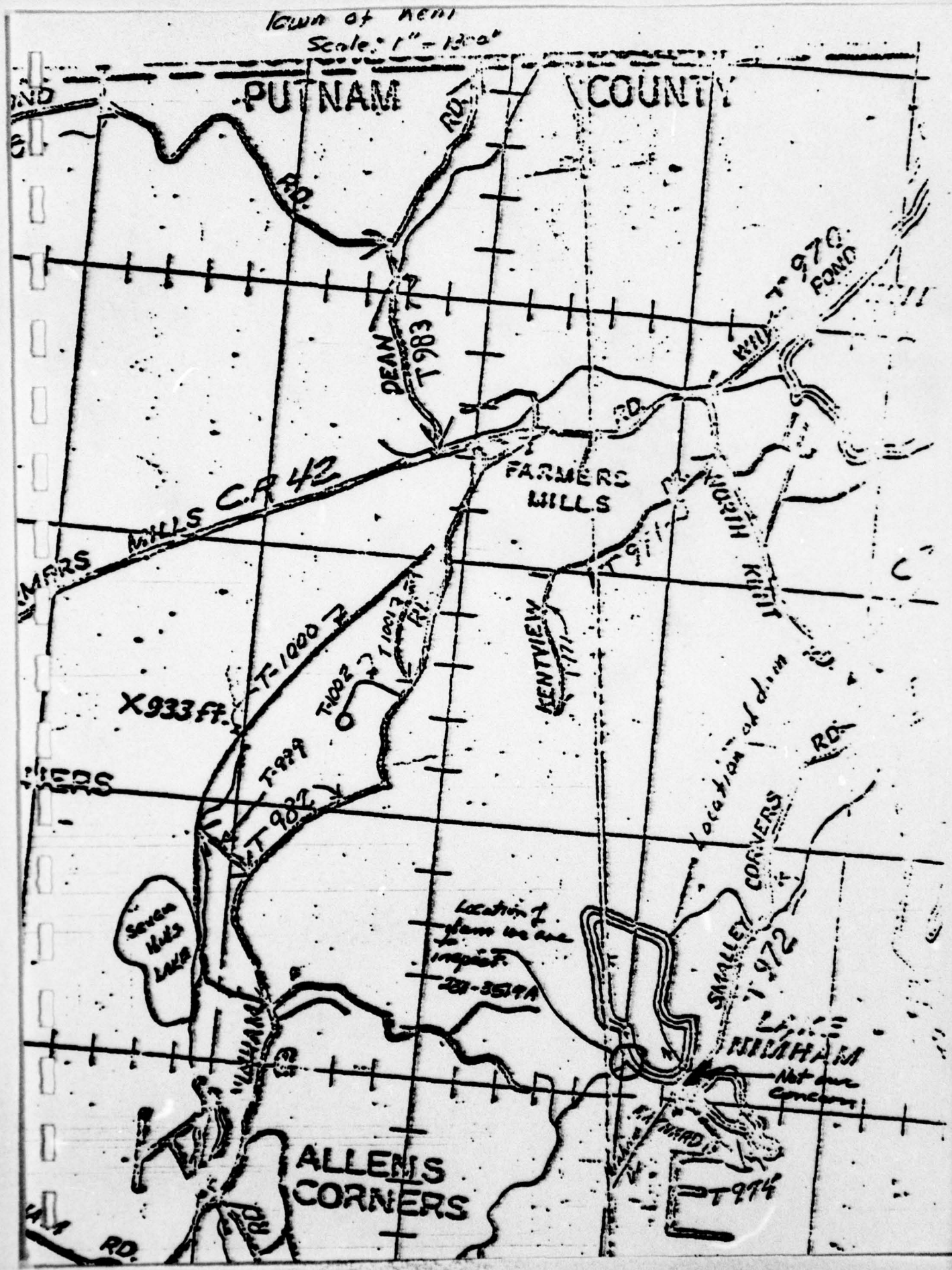
I have been unable to locate a copy of the approved design plans for this particular dam but I have reason to believe it was approved under #231-1475 LHW. If possible, would you please furnish this office with a set of plans for this dam and thus a more detailed inspection can be undertaken, with supporting pictures, when the snow has left this area.

Very truly yours,
M. N. SINACORI
District Engineer

CJ Wells

By
C. J. Wells
Engineer for Town
and County Roads

CJW:cfk
Attmt.


Town of Kent
Scale: 1" = 1200'
PUTNAM COUNTY
RD.
PEAN
T 983
T 970
FARMERS MILLS
C.R 42
MILLS
NORTH
KENTVIEW
T-1000 F
X933 ft.
T-929
T 982
Location of dam
RD.
CORNERS
SMALLEY
T 972
Location of dam we are to inspect
281-351A
Sewage Disp. Lake
WHARAM
Not our concern
ALLENS CORNERS
T 974
RD.

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS

J. BURCH McMORRAN
SUPERINTENDENT

M. N. SINACORI, DIST. ENG.
20 DUTCHESS TURNPIKE
P. O. BOX 591, POUGHKEEPSIE, N. Y. 12602

COUNTIES IN 9TH DISTRICT
COLUMBIA
DUTCHESS
ORANGE
PUTNAM
ROCKLAND
ULSTER
WESTCHESTER

RECEIVED
DIST. SUPT.
OPER. AND
CANALS
FEB 19

HW 231-1475
Lake Ninham
Town of Kent
Putnam County

POUGHKEEPSIE, N.Y.

February 18, 1965

Re: My Letter of 2/3/65

Mr. E. C. Hudowalski, Ass't. Superintendent
of Operation & Maintenance (Canals)
State Department of Public Works
Albany, New York

Attention: A. Dickinson
Assoc. Civil Engineer

Dear Sir:

On February 15, 1965, I inspected the above referenced dam and am enclosing a sketch showing where four (4) pictures were taken. Pictures #3 and #4 show slight seepage through the base of the dam on the north and south end of the embankment. Since this dam has apparently never flooded over Smalleys Corners Road and the fact that the watershed is but 146 acres, I doubt that it will cause any damage providing the 30" R.C.P. outlet pipe is kept clear.

This is no dam we are to inspect CWW 6/14/78

In connection with the above inspection, I became aware that the dam to the west had recently been breached. Upon inquiry, I found that this dam had broken around 10:00 P.M. on the 9th of February, 1965. This dam is in all probability #LHW 232-2327 of which no plans seem to be available in the District Office files. The collapse of this dam caused damage to Cole Shears Road and to a dam owned by Rose and Whittier just north of Cole Shears Road. Water had also crossed East Boyds Road; however, evidence of damage in this case was nil. I am attaching a map which shows the areas that were damaged.

I am also enclosing a sketch of this breached dam showing where eight (8) pictures were taken on the 15th of February.

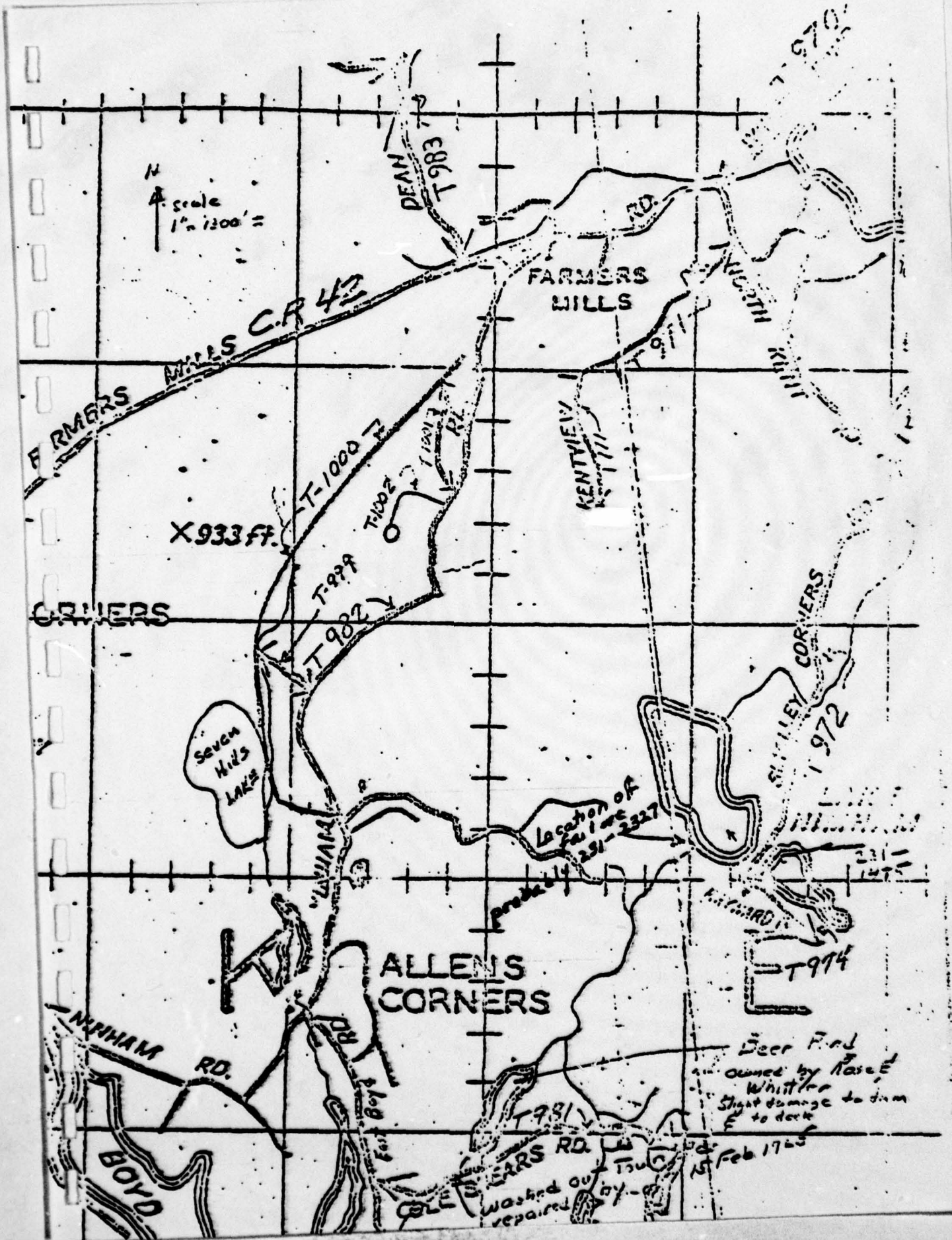
Probably the feature in 1955

While talking with the neighbors, I became aware that this dam had failed once before and it would seem that the Department of Public Works should insist upon a very adequate design if ever an attempt is made to obtain a permit to restore this embankment. The present owner of the dam which failed is either Mr. Joseph Freund, Lake Ninham, Carmel, N. Y. or American Business Resources Company, Box 476, Croton Falls, N. Y.

Very truly yours,
M. N. SINACORI
District Engineer

C. J. Wells
Engr. for Town & County Roads

CJW:cfk
Attmt.


N
scale
1" = 1200' =
DEAN
T983
RD.
FARMERS
MILLS
C.R 42
FARMERS MILLS
T-1000
T1002
X933 Ft.
KENTVIEW
T977
T979
T982
CORNERS
SHIRLEY CORNERS
T972
Seven Kids Lakes
Location of Fence 231-2327
ALLENS
CORNERS
T974
T981
NEWHAM RD.
BOYD
Deer Rd
owned by Rose E Whittier
Slight damage to dam
Feb 1975
Washed out
repaired by -

March 19, 1965

E. C. Wadowaleki
Assistant Superintendent, O & M

John T. Peck
Senior Civil Engineer

Report on Inspection of Dams
on Thursday, May 11, 1965
In cooperation with
Joseph C. Wells of District 3

Not ours — see next page.

Dam #231-1475 at outlet of Upper Nimham Lake, Town of Kent, County of Putnam.

The embankment of this dam serves as a town road and is a part of Lake Nimham Road which presently extends southward from its intersection with Gipsy Trail Road to a point approximately 100 feet south of Upper Lake Nimham. It is our understanding that the maintenance of this road is vested in the Town of Kent.

Water was observed flowing over the top of the vertical, concrete box inlet into a 30" dia. outlet pipe at its base. The top of the inlet structure is 4" higher from that shown on the approved plans. A sluice gate is provided. The area draining into upper Nimham Lake is approximately 186 acres.

At the downstream end of the dam, the 30" outlet pipe which discharges into Lower Lake Nimham was half-way submerged in the water. For some distance away from the dam there appeared to be a depression in the bed of the lake with the high point of the bed being higher than the invert elevation of the outlet pipe. This condition is not conducive to free flow through the outlet pipe. The elevation of the waters of Lower Nimham Lake on this date was much lower than that normally held, prior to the breach in the dam at the outlet of Lower Lake Nimham, under which conditions the above mentioned outlet pipe would be fully submerged.

Some seepage of water was noted at a couple of places at the downstream base of the dam. Whether this water is percolating through crevices in the dam or rising from springs overlaid by the dam would be difficult to determine without dye tests being performed.

E. C. Mudowalski March 19, 1965

The dam, according to Mr. Joseph Freund (former owner of the structure and now overseer of the structures) has been in existance for 15 years and has not been topped or washed out even during the worst storms of the summer of 1955. Its failure would wash out the town road and would surge into Lower Lake Mirham raising its water level which in turn could possibly top the dam at its outlet.

As of this day the dam appeared to be in good condition.

Dam #231-2327 at Outlet of Lower Lake Mirham, Town of Kent, County of Putnam. This is ours

Today's inspection of this dam verified the report and photographs concerning the structure received by this office on February 18. However, additional comments concerning the structure are in order.

The break in the dam occured at the westerly end of the vertical concrete box inlet with the surging waters swirling around that end. The washout produced a trapezoidal shaped breach measuring about 10 feet wide at the top and 5 feet wide at the bottom and about 10 feet deep. The surging and swirling waters cut a radial path around the box structure on the upstream side leaving intact a greater portion of the sloping embankment behind the box structure. The exposed section of the breach showed the embankment to be poorly compacted with numerous large stones lying at the bottom of the gap. One cannot but assume that these stones were part of the fill of the embankment. It was difficult to surmise just at which point the erosion started. The foundation of the vertical box structure did not appear to be undermined, which leads to the assumption that the weakness was near the top of the embankment, although there was about 3 feet of freeboard between the top of the dam and the top of inlet structure.

The top of the inlet structure is about 12" higher from that shown on the plans. Two sluice gates are provided. One sluice gate is now open in order to keep the elevation of Lake Mirham at a lower level.

The area draining into Lower Lake Mirham is approximately 960 acres or 1.5 square miles.

E. C. Rudowski March 19, 1965

It is the second time that the embankment portion of the dam has washed out. It is possible that the raised portion of the vertical box inlet may have contributed to the cause. Should plans be submitted for the reconstruction of the dam it will in the best interest of all concerned to recommend that the top of the vertical box inlet be cut down to the same elevation as the invert elevation of the outlet pipe at Upper Lake Mahan. It should also be recommended that deflector walls 10 feet minimum in length, carried down into an impervious material, be securely attached to the easterly and westerly sides of the vertical box culvert. In closing the breach in the embankment, the sides should be trimmed to an even slope and the opening filled with impervious materials placed in one foot layers and thoroughly compacted.

There appears to be a question concerning the ownership of the dam. We are advised that the following persons have interest in the dam, to wit:

a. Mr. Joseph Freund, Lake Mahan, Carmel, N.Y.
b. American Business Resources Co., Box 476, Croton Falls, N.Y.
c. Lake Mahan Realty Co.
d. Dogwood Acres, Mahopac, N.Y., as listed on the Assessor's book for the Town of Kent.

Mr. Freund, has been requested to notify this office immediately if any work of reconstruction on the dam is started. To date no plans for its reconstruction have been received.

Submitted by

Sr. Civil Engineer

JR:ab

STATE OF NEW YORK

DEPARTMENT OF PUBLIC WORKS

J. BURCH McMORRAN
SUPERINTENDENT

M. N. SINACORI, DIST. ENG.
3D DUTCHESS TURNPIKE
P. O. BOX 509, POUGHKEEPSIE, N. Y. 12603

DUTCHESS
PUTNAM
ROCKLAND
ULSTER
WESTCHESTER

POUGHKEEPSIE, N.Y.

September 2, 1965

Mr. J. Burch McMorran
Superintendent of Public Works
State Department of Public Works
Albany, New York

Dear Sir:

I am submitting a copy of the report on the dams at Lake Kinhaw which I sent to Mr. Hudowalski.

It is unfortunate that certain unscrupulous individuals, whomever they might be, who own this dam cannot be found and made to do things properly. To date, I have not been able to determine the owners of this dam.

In my phone conversation with Mr. Rosenman, he has also stated that he can't "get his hands" on the owners.

Mr. Rosenman has stated that since he cannot serve these parties with a summons, and complaint, that he will accomplish this by serving the Secretary of State.

According to Mr. Rosenman, the alleged owner is:

Dogwood Lake, Inc.
New Hope, N. Y.

I am afraid that until such time as the owners of this dam are found, that we are helpless to enforce the provisions of the Conservation Law.

Mr. Rosenman is looking into whatever legal means we may have available in order to satisfactorily bring this matter to completion.

Engineer for Town
and County Roads

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS

J. BURCH McMORRAN
SUPERINTENDENT

M. N. SINACORI, DIST. ENG.
20 DUTCHESS TURNPIKE
P. O. BOX 551, POUGHKEEPSIE, N. Y. 12603

COUNTIES IN 9TH DISTRICT
COLUMBIA
DUTCHESS
ORANGE
PUTNAM
ROCKLAND
ULSTER
WESTCHESTER

Dams of Lake Ninham
#231-2327 (Lower Dam)
#231-1475 (Upper Dam)
Town of Kent
Putnam County

POUGHKEEPSIE, N.Y.

September 3, 1965

E. C. Hudowalski, Ass't. Superintendent
Operations & Maintenance (Canals)
State Department of Public Works
Albany, New York

Dear Sir:

Because of all the publicity given these dams, as well as their past history, I decided to inspect them more than once in a month. These dams were inspected August 3 and on August 31, 1965.

The enclosed photographs were taken on August 3, 1965.

I find the condition of the upper dam the same as at the time of Mr. Peck's inspection of March, 1965.

The condition of the lower dam, however, has changed since the March inspection. Although no permit for rebuilding a dam has been applied for, the dam has been reconstructed, and, in apparently, not the best manner. From a field inspection it is obvious that the new embankment has not been properly compacted, and that the fill consists of material ranging anywhere from that which can pass a #200 sieve, to huge boulders.

As noted in your March report, one of the sluice gates is open. However, I noted that the level of the lake was about 1½ ft. higher than on the August 3rd visit (these had been shown on August 29, 1965). I am of the opinion that both sluice gates should be opened 'till this dam is properly reconstructed. I agree with Mr. Peck's opinion that the elevation of the vertical inlet be cut down to that of the outlet pipe from upper Lake Ninham, for in a severe storm I fear that even with both sluice gates open, at the lower dam, the water in the lower dam would rise to the top of the vertical inlet shaft, and thereby, possibly imperil the upper dam.

Very truly yours,
M. N. SINACORI
District Engineer

By J. Camallonga
J. Camallonga
Engineer for Town
and County Roads

JC:cfk
Attmt.
cc: J. B. McMorran

Friend Clerk
File
Canal Permits
Traffic & Floating Bridges
Control
Construction
Referred to:
SEP 3 1965
RECEIVED
ASST. SUPT.
OPER. AND MAINT.
CANALS

RECEIVED
ASST. SUPT.
OPER. & MAINT.
WATERSHED PROTECTION DIVISION

MEMORANDUM

February 23, 1966

Referred to:
[illegible] Construction
[illegible] Control
[illegible] Office
[illegible] Filtering Plant
[illegible] Reports
[illegible]

TO: Mr. E. C. Hudowalski
Assistant Superintendent of O & M

FROM: Mr. Wm. P. Hofmann, Director
Bureau of Soil Mechanics

PROJECT: Dam No. 231-1475
Upper Nimham Lake
Town of Kent
Putnam County

In accordance with your request this Bureau has made an investigation of the subject dam to appraise its present safety and the reasons for the previous failures. Our investigation was based on the following information:

(1) The plan for this dam prepared by Roy Burgess, Consulting Engineer, of Carmel, New York, and dated February, 1954.

(2) An examination of four drill hole logs of borings progressed at this site by the District Soils Section.

(3) Previous reports and correspondence pertaining to this dam supplied by your office.

(4) A field inspection of the dam and the general site by Mr. J. N. Currier of this Bureau in February of this year.

The original plan referred to above, indicates a design which in general appears to be adequate for the purpose intended. However, one exception to the design of the dam pertains to the outlet structure risers which should have been located further away from the upstream embankment slope.

Mr. Currier's inspection of the site and examination of the boring logs indicates that the dam is probably constructed of local borrow material with little attempt made to obtain "selected fill" as called for on the plans. The soils used were generally sand, silt, and gravel mixtures with occasional stones. This type of material is relatively pervious and susceptible to detrimental seepage. It is significant that both Mr. Currier and Mr. Peck of your office noted some seepage downstream from the dam. However,

Copy to WRC 4/27/66

neither was able to determine whether this seepage was coming through the dam. According to all available information, the dam is holding water. Consequently, any seepage that does occur, is probably not large in magnitude. However, further study is warranted at a later time of the year, such as summer or fall to determine if a significant seepage problem is occurring through the dam.

Mr. Currier noted and concurred with Mr. Peck that a source of trouble and probable cause of the previous failures is the entrance elevation to the outlet chamber structure. The plans called for the top of the outlet structure to be at elevation 493.5 whereas water is now required to enter this chamber at elevation 495.3. Consequently, the freeboard of the dam is less than one foot. This is insufficient freeboard and explains peak flows overtopping the dam and causing washouts at the outlet structure risers. Another observation of Mr. Currier's conterns the 12 inch diameter concrete pipe which extends from the lake into the outlet chamber. This pipe as now situated, could easily become clogged and could be an attributing factor for another washout.

In conclusion, we offer the following comments:

(1) The outlet structure at its present elevation and proximity to the upstream face of the dam is probably the major cause for previous washouts. Consequently, it would be advisable not only to lower the elevation of the riser, but if practical, shift its location away from the upstream slope. The 12 inch diameter pipe now acting as an intake to the riser chamber does not constitute an adequate outlet and may contribute to another washout if it becomes wholly or partially clogged.

(2) The dam appears to be constructed of local granular borrow materials. These materials may be susceptible to a long-term "piping" condition. Therefore, it is our recommendation that an additional inspection of the downstream slope area be made during the summer or fall to evaluate this condition and to determine if some downstream slope protection treatment is required. According to our review of the correspondence, all seepages noted were observed in the winter months.. If seepage through the dam is found to be a potential problem, some supplemental treatment procedures should be followed.

It should be realized that it is virtually impossible to accurately appraise the safety of a dam after construction when little or nothing is known of the construction procedures, practices and workmanship. This is particularly true of earth dams.

We are enclosing the information which you made available for our study. We will be pleased to discuss this report in further detail if you so desire.

Very truly yours,

Wm. P. Hofmann

Wm. P. Hofmann, Director
Bureau of Soil Mechanics

BEB/mfk

cc: Mr. G. W. McAlpin

DAMS

STATE OF NEW YORK — WATER RESOURCES COMMISSION — CONSERVATION DEPARTMENT — ALBANY, N.Y. 12226

WRC FORM 82
5/66 (REVISED)

STATE OF NEW YORK
WATER RESOURCES
COMMISSION
RECEIVED
FEB 27 1967

Do Not Write in This Box

Appl. No. 8-8-67
Permit No. _____

Dam No. 231A-3519A
Watershed Lower Hudson River

Application for a Permit for the Construction, Reconstruction or Repair of a Dam or Other Impoundment Structure under Conservation Law, Section 429(c).

INSTRUCTIONS

1. Type or print in ink.
2. Five (5) copies of all papers must be filed.
3. The completed application relating to construction, reconstruction or repair of a dam must include the following information:

   (a) A topographical plan (with contours) of the impounded area drawn to a suitable scale.

   (b) A profile and transverse section of the impounded area showing the proposed excavation, the normal water and possible high water elevations. A 1'-0" minimum of freeboard is to be provided between the top of the dam and the possible high water.

   (c) A longitudinal elevation and transverse section of the dam with all the necessary details of the related appurtenances, spillways, drains, etc.

   (d) A log of the soil information. Samples of the materials to be used in the dam and of the material upon which the dam is to be founded may be asked for, but need not be furnished unless requested.
4. No work of construction, reconstruction or repairs of the structure or structures shall be started until a permit therefor has been issued by the New York State Water Resources Commission.
5. The design, preparation of plans, estimates and specifications and the supervision of the erection, reconstruction and repair of all the structures herein applied for shall be done by a licensed professional engineer, or in the case of farm ponds by an engineer or conservationist employed by a governmental agency cooperating with a soil conservation district, or by an engineer employed by the Conservation Department.
6. A "Notice of Application" must be published by the applicant. The form of notice and instructions for publication will be furnished to the applicant by the Local Permit Agent to whom the application is delivered.

APPLICATION

Application is hereby made by Reeling Daulton Putnam Corp.
to the Conservation Department acting on behalf of the Water Resources Commission, pursuant to the provisions of Conservation Law, Section 429(c) for a permit to (construct) (reconstruct) (repair) a dam or impoundment structure substantially as shown on plans and specifications marked Lake Kirbon Spillway addition Dwg 1/27/67
herewith submitted and described.

It is intended to commence the work covered by the application about ~~as soon as possible~~ (Date) and complete it about 12/31/67 (Date)

1. The dam will be on an unnamed brook flowing into Boyd Corners Reservoir in the town of Kent County of Putnam and 2500 feet southwest of intersection of Kent Hollow Rd. & Kent Rds. (Give exact distance and direction from a well-known bridge, dam, village, main cross-roads or mouth of a stream)
2. Location of dam is shown on the attached map or overlay of the Lake Carmel quadrangle of the United States Geological Survey at latitude _____ longitude _____
3. The impounded water will be used for recreation
4. Will any part of the dam be built upon or its pond flood any State lands? No
5. The area draining into the proposed pond or lake is 520 acres; _____ square miles.
6. The computed 50 year peak rate of runoff used in the design is 1340 cu. ft. per sec. State criterion or method used in determining the peak rate of runoff Modified Cooks method
7. The maximum height of the proposed dam above the bed of the stream will be 10 feet _____ inches.
8. The designed maximum high water elevation above the spillcrest is computed to be 2 feet _____ inches; the designed freeboard as measured from the maximum high water elevation to the top of the proposed dam will be 2 feet _____ inches. (One foot minimum)
9. The open spillway of the proposed dam that will control the designed flood flow will be of vegetated earth
(State type, such as: vegetated earth, concrete, masonry, timber, rock filled crib, etc.)

The width of the control section of the spillway, measured normal to the flow of water at the crest, will be 37 feet _____ inches in the clear; facing down stream, the waters will be held at the right end by a vegetated earth embankment the top of which will be 2 feet _____ inches above the spillcrest, and have a top width of 20 feet _____ inches; and at the left end by a vegetated earth the top of which will be 2 feet _____ inches above the spillcrest and have a top width of 60 feet _____ inches. The slope of the sides of the spillway will be 1 on 3 (left) 1 on 3 (right).

10. The spillway is designed to safely discharge 1340 cu. ft. per sec.

11. The surface area of the proposed pond or lake will be 40 acres at the normal water elevation and 40 acres at the spillcrest elevation; the volume of the water impounded in the pond or lake will be 160 Ac. ft. gallons at the normal water elevation and 160 Ac. ft. gallons at the spillcrest elevation.

12. The normal water elevation of the proposed pond or lake will be 2 feet ____ inches below the spillway crest, and will be maintained by means of a 9-Letter concrete chimney; the pond or lake will be drained by means of a two 12" pipes; provision will be made for supplying water to riparian owners downstream, during dry seasons, by means of Chimney and/or 1 Valve.

13. The maximum discharge through the spillway that controls the normal water elevation will be 330 cu. ft. per sec. during maximum high water.

14. If flashboards are to be used to control flood flow they must be of the automatic or self-tilting type, designed to fail or otherwise permit full discharge through the spillway when the flood waters reach a height of ____ feet ____ inches above the spillcrest.

15. If an overfall structure is used as a spillway, it shall be provided with an apron constructed of ____; the thickness of the ____ will be ____ feet ____ inches, the width ____ feet ____ inches across the stream and the length ____ feet ____ inches parallel to the stream.

16. Facing downstream, what is the nature of material composing the right bank? Unknown. It will be in virgin ground. If suitable material is not found on excavation then an emerg. spillway will not be built.

17. Facing downstream, what is the nature of the material composing the left bank? (same as 16)

18. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) (does not apply- this is a reuse)

19. Are there any porous seams or fissures beneath the foundation of the proposed dam? No.

20. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. (see 16)

21. Was the above soil information obtained from soil borings? ____; test pits? ____

22. State the height above the spillcrest elevation of the lowest part of the immediate upstream adjoining property or properties: Causeway 1 feet + 7.5 ft. inches.

23. Does this proposed pond or lake constitute any part of a public water supply? No. If not, where is the nearest downstream public water supply intake located? Dyed Lake Res.

24. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam Road and dock dam only.

25. The design, plans and specifications have been prepared under the supervision of R.D. Essert (Authorized Agency) or P.E. License No. 20219

Address 121 Vassar Rd., Poughkeepsie, N.Y. Title ____

26. The reconstruction and repair (State which: Erection, Reconstruction or Repairs) will be under the supervision of R.D. Essert (Authorized Agency) or P.E. License No. 20219

Address ____ Title ____

27. Name and address of official newspaper of the town or city in which the proposed works are to be located,

All provisions of law will be complied with in the erection and maintenance of the proposed dam or impoundment structure. The construction will be carried out substantially in accordance with the approved plans and specifications.

If the applicant is other than the owner, the applicant certifies that he has been duly authorized by the owner to make the application and to carry out the project described herein.

The applicant certifies the truth of the above statements and agrees that the issuance of the permit is based on the accuracy thereof. As a condition to the issuance of a permit, the applicant accepts full legal responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

Dutch Equities Holding Corp., Owner

By [signature] V.P., authorized agent of owner.

Address of owner ____

Address of signer ____ Date ____
(If other than owner)

NOTE: Acceptance of a permit subjects permittee to restrictions, regulations or obligations stated in application and permit.

STATE OF NEW YORK
RESOURCES

JAN 25 1967

COMMISSION
RECEIVED

Scale 1" = 2000'

0-5% 43 Ac
5-10% - 21 Ac
10-30% - 613 Ac
30-35% 73 Ac

Lake Minnetonka
Area Grades
C.S.D. 1/1/67

Lower Lake Windham 1/20/67 R.D. Eaves

Estimate of Runoff

Relief			W
93 Ac @ 3%	93 × 8 =	740	
21 Ac @ 10%	21 × 20 =	420	
613 Ac @ 28%	613 × 25 =	15300	
93 Ac @ 40%	93 × 35 =	3250	
		19710/820 =	24

Soil Infiltration			
410 Ac of Gp B	410 × 8 =	3280	
410 Ac of Gp C	410 × 13 =	5320	
		8600/820 =	10.5

Vegetal cover			
400 Ac of Deep Woodland	400 × 3 =	1200	
400 Ac of Medium "	400 × 5 =	2000	
20 Ac of no cover	20 × 20 =	400	
		3600/820 =	4.4

Surface Storage

Well scattered lakes & swamps exceeding 5% of watersh 3

$\Sigma W = 42$

$Q_{SP} = P_{SP} R S_{swamps} = 1600 \times 0.93 \times 0.9 = 1340$ cfs.

Design of Emerg. Spillway

Temp storage = 2"; pond @ prim. level = 40 Ac; V_{max} = 5.8 fps.

$A_w/A_p = \frac{820}{40} = 20.5$"; adjusted (Fig 3.10B) = 20

Design flow = 1340 × .20 = 268 cfs.; from sheet 389, W_b = 37';

outlet slope = 2%; outlet length = 93'; Side slope = 3:1

PERMIT NO. 8-8-67
DAM NO. 231A 3519A
Lower Hudson River W.S

STATE OF NEW YORK
WATER RESOURCES COMMISSION
CONSERVATION DEPARTMENT

Realty Equities Putnam Corporation residing at
Attn. Mario Scappaticci, 540 Tuckahoe Road, Yonkers, New York
is hereby permitted to: (construct) (reconstruct) (repair) (alter the bed or banks of) (dredge) (place fill in)
reconstruct an impoundment
Located in County Putnam Town. Kent by
carrying out the following works: Reconstruct dam at lower Lake Numham according to plans prepared by Robert D. Essert, P. E., and provide emergency spillway at Upper Lake Numham
Section of stream to which this permit applies Lakes Numham on Bailey Brook

Note: (a) This permit does not relieve the permittee of responsibility for damages to riparian owners or others.
(b) If the structure or work herein authorized is not completed on or before 31 day of December, 1968, this permit, if not specifically extended, shall cease and be null and void.

CONDITIONS

1. The permitted work shall be subject to inspection by an authorized representative of the Water Resources Commission who may order the work suspended if the public interest so requires.

2. The permittee shall file in the office of the Local Permit Agent a notice of intention to commence work at least 48 hours in advance of the time of commencement and shall also notify him promptly in writing of the completion of the work.

3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

4. Any material dredged in the prosecution of the work herein permitted shall be removed evenly, without leaving large refuse piles, ridges across the bed of the waterway, or deep holes that may have a tendency to cause injury to navigable channels or to the banks of the waterway.

5. Any material to be deposited or dumped under this permit, either in the waterway or on shore above high-water mark, shall be deposited or dumped at the locality shown on the drawing hereto attached, and, if so prescribed thereon, within or behind a good and substantial bulkhead or bulkheads, such as will prevent escape of the material into the waterway.

6. There shall be no unreasonable interference with navigation by the work herein authorized.

7. That if future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Water Resources Commission it shall cause unreasonable obstruction to the free navigation of said waters or endanger the health, safety or welfare of the people of the State, or loss or destruction of the natural resources of the State, the owner may be ordered by the Commission to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State; and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners shall, without expense to the State, and to such extent and in such time and manner as the Water Resources Commission may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

8. That the State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

9. That if the display of lights and signals on any work hereby authorized is not otherwise provided for by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the owner.

10. All work carried out under this permit shall be performed in accordance with established engineering practice and in a workmanlike manner.

11. This permit shall not be construed as conveying to the applicant any right to trespass upon the lands of others to perform the permitted work or as authorizing the impairment of any right, title or interest in real or personal property held or vested in a person not a party to the permit.

12. Nothing in this permit shall be deemed to affect the responsibility of the permittee to comply with any applicable Rules and Regulations of the U.S. Army Corps of Engineers or any other governmental agency having jurisdiction.

ther Conditions:

13. An 18" layer of compacted impermeable materials will be placed on upstream face of dam extending 50' beyond the toe of the dam. All organic materials and objectionabl. materials shall be stripped and exposed surfaces scarified before placing impermeable material.
14. Four concrete cutoff collars will be placed around the twin 48" drain pipes.
15. Prior to casting cutoff walls, realign pipes if necessary and seal any openings or joints.
16. Emergency spillway will be provided with materials suitable for growing grass.
17. After cutoff walls are cast, form sides of breached area to uniform slope.
18. Breached section of dam will be filled with well compacted impervious materials placed in 6" layers.

The issuance of this permit certifies that it is not contrary to the public interest that the proposed works be done.
The applicant in accepting this permit signifies his agreement to abide by the conditions set forth above.

pplication Date 2/14/67 Expiration Date 12/31/68

Permit Issued 8/14/67

y Building #2, State Campus, Albany, New York 12226
Central (Permit Agent) (Name and Address)

Conditions, con't.

19. Before any backfilling is done or impervious fill placed, notify Mr. N. M. Sinacori of date and time that operations will be performed.

cc: Mr. McKeon (2)
Mr. Stellato
Mr. Sinacori
Mr. Essert
Mr. Porco

EJD:hac

STATE OF NEW YORK
CONSERVATION DEPARTMENT
Division of Water Resources

ALBANY, NEW YORK 12226

January 13, 1967

Robert D. Essert, P. E.
124 Vassar Road
Poughkeepsie, New York 12603

Re: Application No. 8-28-66
Lakes Nimham

Dear Mr. Essert:

As a result of our conversation of January 12, 1967 the following steps are indicated:

1. Provide an emergency spillway from the upper level lake across the Lake Nimham Road. This can be in the form of culverts (we discussed pipe arch cross section) with the invert one foot higher than the lip of the drawdown. At a location about 200 feet northerly of the drawdown there is a heavy rock ledge or sill that would be desirable as a discharge area for the culverts.

2. Build dike of lower level lake to an elevation 4 feet higher than the lip of the drawdown. Excavate around barrels of drawdown to determine if cutoff walls were ever installed. If not cast cutoff walls in place around both barrels.

   Establish a wingwall from drawdown structure extending about 5 feet from drawdown to reduce chance of event recurring. Tie to existing structure carefully.

   Develop an emergency spillway on undisturbed area about 150 feet southeasterly of the drawdown. Level control section of spillway will be 2 feet higher than lip of drawdown.

   Investigate soundness of timber at top of both drawdowns. If it has deteriorated, remove and place trash guards directly on the concrete structures.

Robert D. Ebert, P. E. January 13, 1967

STATE OF NEW YORK CONSERVATION DEPARTMENT Division of Water Resources

Remove boulders and debris from discharge structure of drawdown of lower level lake. Remove debris in bottom of drawdown wells.

The minimum width of top of fill should be 10 feet. Side slopes of dike 3:1 on lake side and 2:1 or flatter on downstream side. Riprap immediately around drawdown.

Before new fill is placed on the dike all old surface should be removed and the surface scarified to allow good bond between existing and new fill. All new fill will be placed in layers not over 6" thick and well compacted with whatever equipment can be used.

New fill may be excavated from within the pond area providing it meets specifications for such fill.

Use the Cook Method of determining peak runoff for design of emergency spillways for both lakes. (Part 3 of Soil Conservation Service Engineering Handbook).

Detailed drawings similar to those prepared originally should be prepared showing:

1. Profile of rebuilt dam including emergency spillway showing where new fill will be placed.

2. Cross section of dam through the drawdown structure showing drain outlet and cutoff collars.

3. Profile of emergency spillway from normal water level to end of constructed section.

4. Cross section of emergency spillway.

Please include copies of all computations for peak runoff, size of spillways, culverts, etc.

Very truly yours,

E. E. DOUGLASS
Assistant Hydraulic Engineer

cc: W. McKeon, Regional Supervisor
H. W. Sinacori
A. Dickinson

RECEIVED
ASST. SUPT.
OPER. AND MAINT.
WATERWAY SUBDIVISION

JUL 21 1967

Referred to:

April 3, 1967

R. A. Cook, Central Permit Agent

J. R. Stellato, Acting Ass't. Supt. O

Maintenance
Design Construction
Flood Control
Lands
Canal Traffic
Locks & Floating Plant
Canal Permits
Canal Clerk
File

WRC Application No. 8-3-67
Dam # Orig. 231-2050
At Lower Lake Hinkum

Before commenting upon the proposed rehabilitation of the above referenced dam a brief history of the structure is in order.

The plans for the construction of the dam were approved on May 6, 1954. In June 1955 a portion of the earth embankment failed. Subsequently revised plans were submitted and later approved on August 4, 1955 under the designation of Dam #231-2307.

On February 9, 1965 the earth embankment failed again. Inspections were made on February 15 and March 11 1965. After the names of the owners were ascertained, the owners were instructed to submit an application, plans and specifications for the reconstruction of the dam.

In the interim between the notification date and the dates of reinspection of the dam on August 3 and 31, 1965, the breach in the dam had been filled with earth material not conducive to the stability of the dam, without notification to this Department.

On September 17, 1965, Mr. Simcori, District Engineer, was requested to make a physical survey of the dam and to have some boring samples taken of the earth embankment.

Further correspondence ensued between this office and the owners relative to the submission of plans and specifications.

Samples of four borings were taken from the earth embankment on November 15, 1965 by the Soils Division of District #8. These samples were sent to the Bureau of Soil Mechanics in Albany for the classification of the soils in the samples.

In a memorandum from the Bureau of Soil Mechanics dated February 23, 1966 to this office, we were advised that: "-----the soils used (in the embankment) were generally sand, silt and gravel mixtures with occasional stones. This type of material is relatively previous and susceptible to detrimental seepage ----" Likewise in the subsurface exploration logs, notations were made of the fact that water was present in three of the boring samples.

On March 15, 1966 plans for the rehabilitation of the dam, prepared by Mr. Robert D. Essert, were received by this office. After review of the plans and a conference with Mr. Essert the plans were returned to him for the incorporation of some recommended changes and additions to the details of the proposed work. Revised plans were resubmitted to this office and after review of same, the plans were approved on April 6, 1966 under the designation of Dam #231A-3519.

In the interim between the approval of the plans on April 16, 1966 and the failure of the embankment on January 8 or 9, 1967 (at exactly the same spot as the failure on February 9, 1965) no work was performed on the reconstruction of the dam because of some technicalities.

An inspection on January 10, 1967 (with photographs taken for the record) of the washed-out portion of the earth embankment substantiated the analysis of the Bureau of Soil Mechanics about the composition of the embankment. The breach revealed many large stones and boulders which were embodied in the embankment. Furthermore it was noted that anti-seepage collars has not been provided around the 48" diameter pipes as called for on the plans approved on August 4, 1965. Likewise, while looking down into the vertical intake well, very little water was noted in the well, but a sound of running water resonated in the well, the audibility of which aroused a suspicion that water might be flowing under the vertical intake structure which could only mean that the foundation under the structure might be eroded. It was also noted during the inspection that the top of the embankment was almost of the same elevation as the top of the intake structure.

On February 1, 1967 revised plans for the rehabilitation of the dam were received. After reviewing same we list our comments as follows:

a. Increasing the height of the embankment by placing 4 feet of impervious earth materials on top of the existing embankment in order to reinforce the dam with a safe freeboard is satisfactory to us provided the new materials will be well bonded to the existing material on top of the embankment.

b. The construction of an emergency spillway at the east end of the embankment, the crest of which will be at an elevation 1.5 feet higher than the top of the intake structures meets with our approval.

[illegible]

c. The removal of the existing bar-grating and timber from around the periphery of the intake structure is satisfactory to us.

d. At least two reinforced concrete anti-seepage collars should be cast around the 48" diameter outlet pipes.

e. The attachment of the wing wall on the west side of the intake structure as shown on the plans is not acceptable because the wall is not properly keyed to the structure nor does it rest on a solid foundation.

f. No statement is made on the plans or in specifications of a method or procedure that will be employed to fill the breached portion of the embankment, which information is of the most importance. Neither is there any mention of the safeguards to be provided to insure unfailing operation of the sluice valves should an emergency arise.

The foregoing comments pertain only to the information and details contained in the revised plans bearing the date of January 27, 1967.

After deliberation and circumspection of the field inspection reports and the soils laboratory analysis reports, it is deemed necessary that some means be provided to prevent future seepages through the existing embankment. This can be accomplished by one of the following suggested methods, to wit:

1. By excavating along the centerline axis of the embankment and installing a 12 inch minimum thickness reinforced concrete core wall carried down to an impervious stratum.

2. By driving a continuous wall of steel sheet piling down to an impervious stratum either along the center line axis or on the upstream face of the dam.

3. By pressure grouting through grout holes drilled into the embankment down to an impervious stratum. The grout holes to be spaced at 10'-0" maximum centers along the axis of the embankment.

4. By placing a thick membrane of impervious earth, reinforced concrete or asphalt on the upstream face, properly joined to a cut-off wall at the base for the entire longitudinal length of the dam.

It is requested that the engineer be instructed to submit revised plans incorporating the suggestions herein listed for further review.

MEMORANDUM

July 17, 1967

TO: J. R. Stellato
Acting Asst. Supt. of O. & M. (Waterways)

FROM: William P. Hofmann, Director
Bureau of Soil Mechanics

SUBJECT: Dam at Lower Lake Nimham
Town of Kent, Putnam County

In accordance with your request of June 19, 1967, we have reviewed the soil and foundation aspects of the proposed repairs and modifications to the above dam. Our study was based on the following:

1. A 1 inch equals 20 feet plan and profile prepared by R. D. Essert dated February 21, 1966, which was revised on June 16, 1967.

2. Two soil samples furnished by your office representing a potential borrow source.

3. A memorandum to you from this office for this project dated February 23, 1966.

We offer the following comments and recommendations to the above plans:

Alternate A

As pointed out by your office, a positive method of seepage control as well as an increased storage capacity (of the existing facility) at flood levels is necessary to minimize any chance of future damage to the dam. Of the two alternatives presented for sealing the dam, we feel that alternate A could, theoretically, achieve this aim but construction of a satisfactory seal would be difficult, if not impossible, to achieve. Excavation of the 15 inch wide trench could be expected to encounter large boulders due to the random nature of the fill used in the initial construction of the dam. Compaction of the clay fill in the trench would be difficult to achieve and inspect. Inadequate compaction could result in large voids extending through the clay fill. The above noted deficiencies associated with Alternate

A could result in the dam being in a worse condition than at present.

Alternate B

This method of sealing the dam should prove effective provided positive controls are used in the selection and placement of materials. We suggest that the impermeable material be well graded from coarse to fine with a maximum particle size of 3 inches, a minimum of 20% of the material by dry weight pass a 200 mesh sieve, and be free of organic matter. The soil samples submitted to us by your office both satisfy the gradation requirements listed above, but one sample has an undesirably high organic content.

We suggest that an 18 inch layer of compacted impermeable material be placed on the upstream face of the dam extending for a minimum distance of 50 feet past the toe of the dam and up the abutment slopes to the permanent pool elevation. Impermeable material should be placed in layers having a maximum thickness of eight inches and compacted to a dry density corresponding to 95 percent of the maximum dry density as determined by AASHO Method T-99, Method C. The moisture content of this material during placement should be within 2+ percent of the optimum moisture content.

Breached Section by Outlet Works

We suggest that anti-seep collars, in addition to those indicated on the plan, be installed around the 48 inch diameter outlet pipes 15 feet downstream from the inlet works to provide greater control of seepage along the outlet pipes.

The breached section should be filled with impermeable material meeting the requirements listed above for this type of material under Alternate B. Due to the narrow width of the breached section, compaction with a hand-operated mechanical tamper will probably be required. Hand tamping should not be allowed.

Additional Fill on the Dam

We feel that compaction and gradation requirements, as indicated under Alternate B, should also apply here.

Emergency Spillway

In our opinion the emergency spillway should be located and constructed at the location specified on the plans. We do not understand the excavation note indicated on the plans for the emergency spillway. We recommend that if, in the opinion of the Engineer, the soil exposed at the excavation limits is susceptible to erosion or unsuitable for growing grass, the section should be undercut for a minimum depth of one foot and backfilled with an approved compacted impermeable material such as indicated under Alternate B of this report.

We are enclosing the material which you made available for our study. We will be pleased to discuss this report in further detail if you so desire.

Very truly yours,

Wm. P. Hofmann, Director
Bureau of Soil Mechanics

By: Bernard E. Butler
Bernard E. Butler
Senior Soils Engineer

EMM/jg
enc.
cc: G. W. McAlpin

July 25, 1967

E. A. Cook, Central Permit Agent

J. R. Stellato, Acting Ass't. Supt. O & M
By: E. Rowan, Assoc. Civil Engineer

Dam at Lower Lake Minhas
Town of Kent, County of Putnam

Enclosed herewith are copies of a memorandum from Mr. William P. Hoffman, Director, Bureau of Soil Mechanics, to this office concerning the above referenced subject matter.

This Department has no objection to the proposed method of rehabilitation of the dam, provided the above mentioned recommendations are fully adhered to by the owner with strict surveillance of the work by an Engineer of the Poughkeepsie District Office.

It is therefore requested that Mr. R. D. Essert, Engineer for the owner, be instructed to resubmit revised plans and specifications incorporating the recommendations of the Bureau of Soils Mechanics for further review.

After approval of the plans and the issuance of a permit for the work by your agency, it will be obligatory for the owner's Engineer to notify Mr. M. N. Sinacori, District Engineer, of the start of the work so that he may arrange to have an Engineer at the site during the progress of the work.

J. R. Stellato

By: _____
E. Rowan
Assoc. Civil Engineer

JEP:fs
CC: Mr. J. Burch McMorran
Mr. M. N. Sinacori
Mr. Wm. P. Hoffman

STATE OF NEW YORK

CONSERVATION DEPARTMENT

Division of Water Resources

Mailing Address: STATE OFFICE BUILDING CAMPUS
ALBANY, NEW YORK 12226

Office Location: 855 CENTRAL AVENUE
ALBANY, NEW YORK

. STUART GILBORNE Commissioner
A. MASON LAWRENCE Deputy Commissioner
ROBERT E. YOUNG Deputy Commissioner
LEMONTOS A. HOPE Secretary

P. W. Montanari
Assistant Commissioner
Director

Nicholas L. Barbaresso
Assistant Director

John F. Thompson
Director of Administration

Edwin L. Yeaniak
Director of Planning

August 4, 1967

RECEIVED
ASST. SUPT.
OPEN, AND MAINT.
WATERWAY SUBDIVISION

Construction
Operating
Canal Patrols
Head Clerk
File

Mr. Robert D. Essert
124 Vassar Road
Poughkeepsie, New York 12603

Dear Mr. Essert:

Re: Application No. 8-8-67
Lake Nimham

It no longer appears that a Public Hearing will be required in the matter of the reconstruction of Lake Nimham, Town of Kent, Putnam County.

The report received from the Bureau of Soil Mechanics suggests using Alternate "B" as shown on attached plans with these comments:

"This method of sealing the dam should prove effective provided positive controls are used in the selection and placement of materials. We suggest that the impermeable material be well graded from coarse to fine with a maximum particle size of 3 inches, a minimum of 20% of the material by dry weight pass a 200 mesh sieve, and be free of organic matter. The soil samples submitted to us by your office both satisfy the gradation requirements listed above, but one sample has an undesirably high organic content.

We suggest that an 18 inch layer of compacted impermeable material be placed on the upstream face of the dam extending for a minimum distance of 50 feet past the toe of the dam and up the abutment slopes to the permanent pool elevation. Impermeable material should be placed in layers having a maximum thickness of eight inches and compacted to a dry density corresponding to 95 percent of the maximum dry density as determined by AASHO Method T-99, Method C. The

moisture content of this material during placement should be within 2+ percent of the optimum moisture content.

Breached Section by Outlet Works

We suggest that anti-seep collars, in addition to those indicated on the plan, be installed around the 48 inch diameter outlet pipes 15 feet downstream from the inlet works to provide greater control of seepage along the outlet pipes.

The breached section should be filled with impermeable material meeting the requirements listed above for this type of material under Alternate B. Due to the narrow width of the breached section, compaction with a hand-operated mechanical tamper will probably be required. Hand tamping should not be allowed.

Additional Fill on the Dam

We feel that compaction and gradation requirements, as indicated under Alternate B, should also apply here.

Emergency Spillway

In our opinion the emergency spillway should be located and constructed at the location specified on the plans. We do not understand the excavation note indicated on the plans for the emergency spillway. We recommend that if, in the opinion of the Engineer, the soil exposed at the excavation limits is susceptible to erosion or unsuitable for growing grass, the section should be undercut for a minimum depth of one foot and backfilled with an approved compacted impermeable material such as indicated under Alternate B of this report."

Please resubmit drawings reflecting the changes noted in red and the memorandum quoted above.

Very truly yours,

R. A. COOK
Central Permit Agent

Encls.
cc: W. McKeon, Regional Supervisor
J. Stellato, Department of Public Works

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 8
COUNTY PUTNAM
S.S.M. PROJ. NO.

HOLE NO. M-1
LINE & STA.
OFFSET

PROJECT LAKE MIN HAN DAM
QUAD. LOCATION
SOIL SERIES

DATE, START Nov. 15, 1965 SURF. ELEV.
DATE, FINISH Nov. 15, 1965 DEPTH TO WATER
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. I.D.
SAMPLER O.D. 2" I.D. 1 3/8"

WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 18"

HAMMER FALL
CASING 18" SAMPLER 18"

ELEV.	DEPTH	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CORE SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
			1	8	5	5			M	BR	Fine Sand, Some Gravel, Tr. Silt & Stones-(Loose)	
			2	3	6	6			M	BR		
			3	5	5	3			M	BR	Fine Sand - Tr.	
	5'								M	BR	Silt, Gravel & Stones	
			4	3	3	2			M	BR		
			5	1	2	1			M	BR	(Compact)	Hole Plugged at 9.5
			6	1	1	2			M	BR		
	10'		7	3	9	9			M	BR		
												Bottom of Boring 10'6"
	15'											

*No ground water encountered.

Note:
No water used in sampling.

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR C. Jett
DRILLING INSPECTOR J. R. Doyo
DISTRICT SOILS ENGR.
SHEET 1 OF 1. HOLE NO. M-1

FORM SMB 2020 (12/64)

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 8
COUNTY PUTNAM
B.S.M. PROJ. NO.

HOLE NO. BH-2
LINE & STA.
OFFSET

PROJECT LAKE NIMHAM DAM
QUAD. LOCATION
SOIL SERIES

DATE, START Nov. 15, 1965 SURF. ELEV.
DATE, FINISH Nov. 15, 1965 DEPTH TO WATER
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. I.D.
SAMPLER O.D. 2" I.D. 1 3/8"

WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 18"

HAMMER FALL
CASING 18" SAMPLER 18"

DEPTH (FEET)	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
0	1	2	2	3			M	BR	Fine Sand-Tr.Silt,Gravel & Stones (Compact)	
	2	3	9	7			M	BR		
5'	3	5	3	2			M	BR	Fine Sand & Silt, Tr. Gravel-(Loose)	
		2	1	1			M	BR		
		2	2	2			M	BR	Fine Sand & Silt, Tr.Gravel & Stones-(Compact)	
	6	4	4	6			M	BR	Fine Sand,Some Gravel,Tr. Silt & Stones-(Compact)	
10'	7	4	10	16			M	BR	Fine Sand,Some Silt,Tr. Gravel - (Compact)	
								BR		
	8	2	3	2			M	GR	Silt & Fine Sand (Compact)	
							M	BR GR		
15'										Bottom of Boring 13'6"
										*Encountered water at 11' Overnight was 9.5 below ground elev.
										After sampling to 13'6"-Hole Plugged at 10.2
										Note: No water used in sampling.

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR C. Jett
DRILLING INSPECTOR L. R. Dow
DISTRICT SOILS ENGR. Harry Wilson

SHEET 1 OF 1. HOLE NO. BH-2

FORM BSM 2000 (12/64)

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 8
COUNTY PUTNAM
B.S.M. PROJ. NO.

HOLE NO. DH-3
LINE & STA.
OFFSET

PROJECT LAKE MYN HAM DAM
QUAD. LOCATION:
SOIL SERIES
DATE, START Nov. 16, 1965 SURF. ELEV.
DATE, FINISH Nov. 16, 1965 DEPTH TO WATER "
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. I.D.
SAMPLER O.D. 2" I.D. 1 3/8"
WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 18"
HAMMER FALL
CASING 18" SAMPLER 18"

DEPTH	BLOWS/6" CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CORE SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
0		1	1	6	6			M	BR	Fine Sand-Some Silt (Loose)	
								M	BR GR	Fine Sand, Tr. Silt, Gravel & Stones-(Compact)	
		2	4	5	5			M	Br	Fine Sand-Tr. Silt, Gravel & Stones-(Compact)	
5'		3	5	5	5			M	BR	(Stone in Shoe #4)	
		4	3	3	3			M	BR	Fine Sand, Some Gravel, Tr. Silt & Stones (Compact)	
		5	3	3	5			M	BR		
		6	3	4	6			M	BR	Fine Sand, Some Silt, Tr. Gravel-(Compact)	
10'		7	4	4	2			M	BR	Fine Sand-Some Gravel Tr. Silt & Stones (Compact)	Refusal 11'6" (See Note 1)
		8	2	9				M	BR GR		Bottom of Boring 11'6"
											Hole plugged at 10'
15'											Note #1 Hit wet streak between 10'6" & 11'
											"Wet Streak 10'6"-11'
											Note: No water used in sampling.

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO CONDITIONS INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATIONS OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR C. Jett
DRILLING INSPECTOR J. R. Deyo
DISTRICT SOILS ENGR.
SHEET 1 OF 1. HOLE NO. H-3

FORM SB 556a (12/64)

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SOIL MECHANICS
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 8
COUNTY PUTNAM
B.S.I. PROJ. NO.

HOLE NO. DH-4
LINE & STA.
OFFSET

PROJECT LAKE NIDISHAN DAM
QUAD. LOCATION
SOIL SERIES

DATE, START Nov. 17, 1965 SURF. ELEV.
DATE, FINISH Nov. 17, 1965 DEPTH TO WATER *
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. I.D.
SAMPLER O.D. 2" I.D. 1 3/8"

WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 18"

HAMMER FALL
CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CORE RECOVERY	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
0		1	1	2	3			M	BR	Sand-Some Silt, Tr. Gravel-(Compact)	
		2	1	7	6			M	BR		
5'		3	3	7	9			M	BR GR	Fine Sand-Tr.Silt, Gravel & Stones-(Compact)	
		4	5	6	5			M	BR GR	Fine Sand, Some Gravel-Tr.Silt & Stones (Compact)	
		5	8	11	12			M	BR GR		
		6	11	21	21			M	BR GR		
10'		7	15	15	8			W	BR GR	Gravel & Stone-Some Sand-Tr.Silt	
15'											Bottom of Boring 10'6"

*Ground water at 8.0-Hole Plugged 8.5

Note:
No Water Used in Sampling

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATIONS OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR C. Jett
DRILLING INSPECTOR J. R. Deyo
DISTRICT SOILS ENGR. [signature]
SHEET 1 OF 1 HOLE NO. DH-4

FORM SUB 2000 (12/64)

PUTNAM COUNTY RTE. NO. COUNTY NO. SECTION NO. PAGE 1 - 2

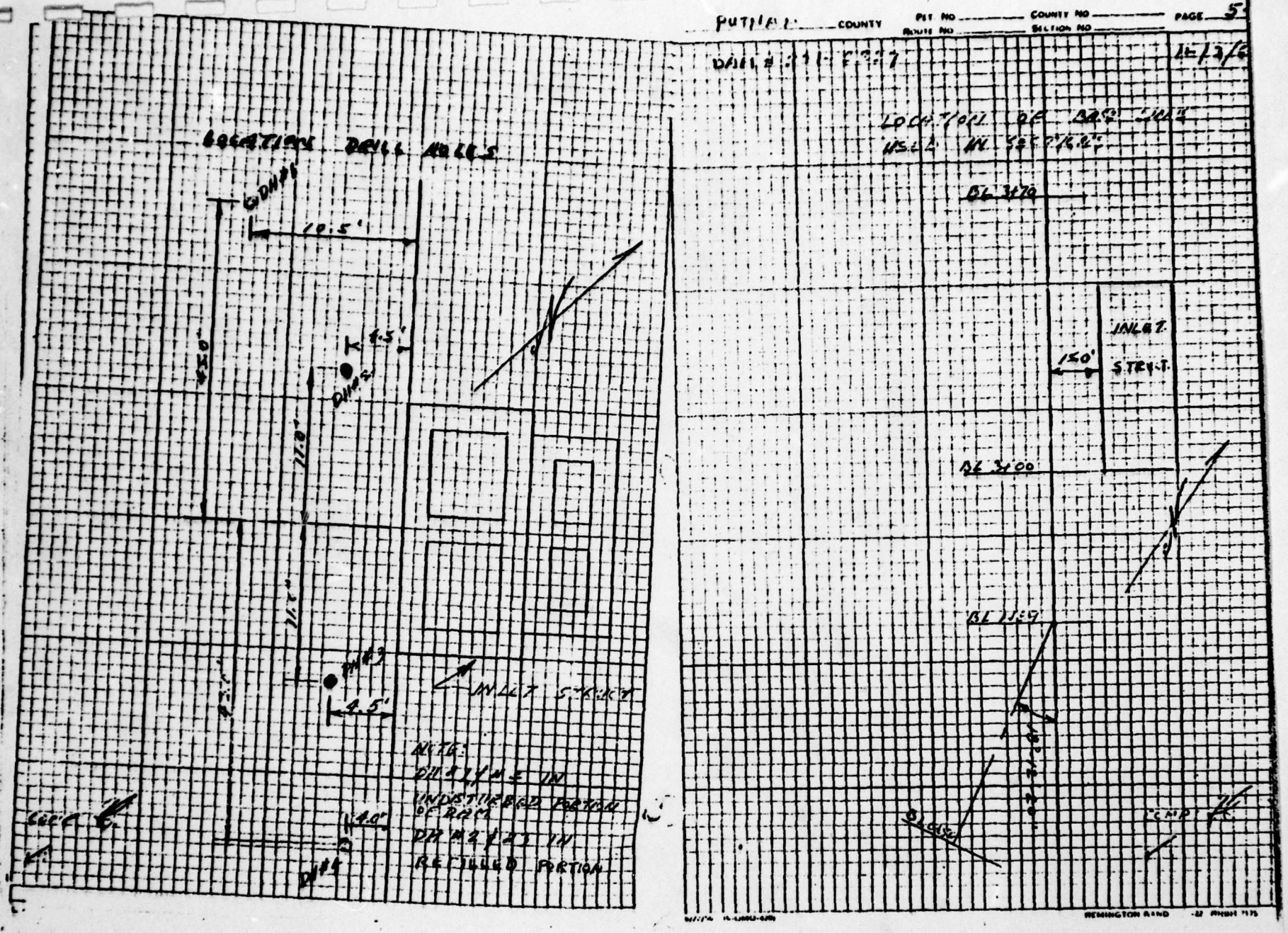
12/3/65
CLOUDY 30°-40°

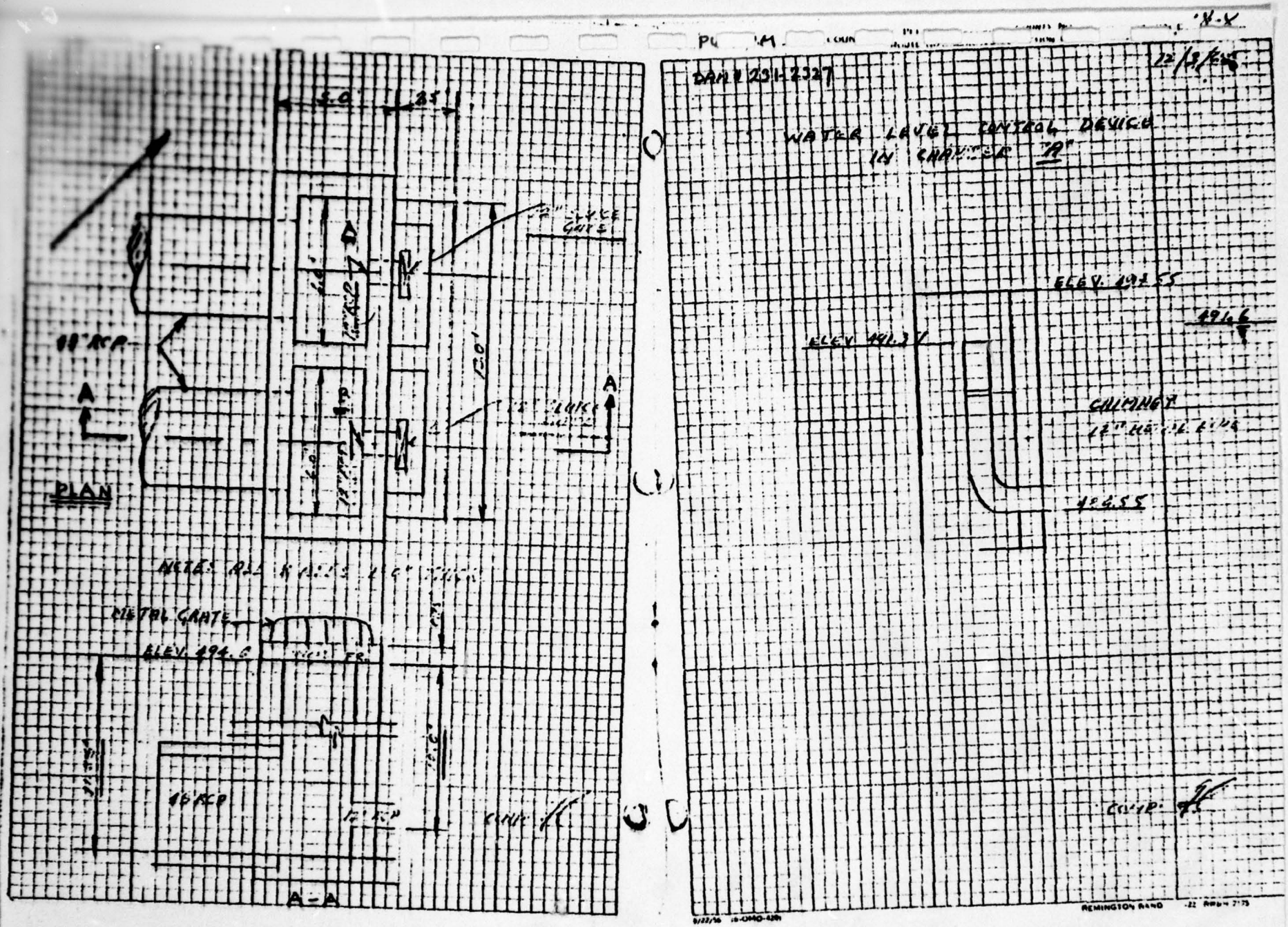
DAM # 231-2327
LOWER LAKE NIMHAM
PUTNAM COUNTY

INFORMATION REQUESTED BY:
E.C. NARDONE SR.
ASST. SUPT. OPER & MAINT.

R.O.W. CAVALLO J.
D.A. BARD J.

PUTNAM COUNTY PIT NO _____ COUNTY NO _____ PAGE 5
ROUTE NO _____ SECTION NO _____




DAM # 231-2327
WATER LEVEL CONTROL DEVICE
IN CHANNEL "A"
ELEV. 492.55
494.6
ELEV. 491.37
CULVERT
42" RCP
ELEV. 492.55
PLAN
METAL GRATE
ELEV. 494.6
16 RCP
A-A
REMINGTON RAND

DNR DAM INSPECTION REPORT Lower Lake N&M Ham

01	40	67	3519A	092471	012	1
RB	CTY	YR AP.	2314 DAM NO.	INS. DATE	USE	TYPE

AS BUILT INSPECTION

- [1] Location of Sp'way and outlet
- [1] Size of Sp'way and Outlet
- [1] Elevations
- [1] Geometry of Non-overflow section

GENERAL CONDITION OF NON-OVERFLOW SECTION

- [1] Settlement
- [1] Joints
- [1] Undermining
- [1] Downstream Slope
- [1] Cracks
- [1] Surface of Concrete
- [1] Settlement of Embankment
- [1] Upstream Slope
- [1] Deflections
- [1] Leakage
- [1] Crest of Da
- [1] Toe of Slope

GENERAL COND. OF SP'WAY AND OUTLET WORKS

- [1] Auxiliary Spillway
- [1] Joints
- [1] Mechanical Equipment
- [1] Service or Concrete Sp'way
- [1] Surface of Concrete
- [1] Plunge Pool
- [1] Stilling Basin
- [1] Spillway Toe
- [1] Drain

- [1] Maintenance
- [3] Evaluation
- [A] Hazard Class
- [3] Inspector

COMMENTS:

new structure in good condition

APPENDIX F

GEOLOGY

APPENDIX F

GEOLOGY

Lower Lake Nimham Dam

1. General Geology

The damsite and reservoir lie in Putnam County. A thin veneer of well drained glacial soils (stony, sandy loam) mantles the county upland areas. Bedrock is normally within 1 to 6 feet of the surface; however, where the soils are less stony, bedrock may be deeper.

The bedrock consists of an undifferentiated Pre-Cambrian biotite granitic gneiss; part of the Reading Prong known as the Hudson Highlands. These rocks (on the order of one billion or more years old) are amongst the oldest in the region. These rocks represent the results of a deep-seated regional metamorphic process which probably acted on sediments in more than one episode, thus producing a very complex historical relationship.

The general dip of the gneiss is to the east-southeast. The rock shows a foliation along a north to northeast direction.

There is a normal fault trending northwest-southeast, south of the dam.

2. Site Geology

The lake is segmented by a road embankment. The upper lake (east of the embankment) is about 4 feet higher than the lower lake (west of the embankment). The dam is on the lower lake. The lake is in a valley, with ridges on the east and west sides of the lake. The lake slopes are moderate, except downstream of the dam, where the outlet stream falls rapidly.

Bedrock is near the surface and covered with a thin veneer of bouldery glacial deposits. The rock type is biotite gneiss. The downstream channel appears unobstructed except for a concentration of boulders immediately downstream of the dam, and two roadway bridges near Boyds Corners Reservoir.

There is a linement (probably a fault) running northwest-southeast through Boyds Corners Reservoir.

Downstream habitation is sparse and appears to be above flood levels.